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# Waste Paper Situation Clarified by OPACS

## Steps Taken By Office of Price Administration and Civilian Supply Explained By Leon Henderson, Administrator, To Clear Up Misunderstanding of Waste Paper Supply Situation—Mills Cooperate.

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., September 3, 1941—Agreements designed to relieve an unbalanced distribution of wastepaper stocks in the East, which already has forced some consuming mills in that area to close down, were announced today by the Office of Price Administration and Civilian Supply.

Twenty-seven companies consuming large quantities of wastepaper have agreed individually with OPACS to allow wastepaper dealers or brokers under commitment to them to divert wastepaper supplies to other mills whose inventories are dangerously low. According to the understanding, each mill permitting such diversion first must have an adequate surplus inventory for its own requirements.

At the same time, OPACS made public a telegram which has been sent to approximately 60 wastepaper dealers and about 20 wastepaper consuming companies in the East calling attention to their previous individual agreements not to charge or bid more for the three basic grades of wastepaper than the prices as of June 16, 1941, plus differentials and charges then in effect. No additional charges are to be imposed, the message said.

Because of certain misunderstandings of the situation, Leon Henderson, OPACS administrator, undertook to clarify in detail the various steps taken by his office to stabilize the wastepaper market. These steps follow:

### Steps Taken for Stabilization

1. On June 18, 1941, individual understandings to abide by wastepaper prices prevailing on June 16 and the differentials and charges then in effect were reached at a meeting with Eastern wastepaper dealers.

2. These understandings were reaffirmed as a further meeting July 25, with the effective date of the agreements extended to October 1.

3. At a meeting on August 8, 20 prominent wastepaper consuming companies in the New York area agreed individually with OPACS not to bid more for wastepaper than the prices previously agreed upon between OPACS and individual wastepaper dealers in that area.

It was understood that prices f.o.b. truck should be 50 cents per ton less than the f.o.b. freight car prices previously announced for the Eastern area. This differential was determined by OPACS field investigators to be consistent with existing trade practices.

### Attempt of Some To Get Higher Prices

In the face of these agreements, there developed in certain trade quarters methods designed to circumvent the maximum prices. Among these methods were the imposition and payment of "special service charges" which were not in effect on June 16; adoption of new names for ordinary grades of wastepaper, thus creating new price classes; or even the buying and selling of one grade or type of wastepaper under a billing providing for an entirely different and more expensive type.

By these means and others certain wastepaper dealers have consistently attemped to force consumers to pay more than the prices determined by OPACS and the wastepaper dealers themselves to be fair and reasonable.

Where resistance has been encountered from consumers seeking to conform to their agreements with OPACS, supplies in some cases have been diverted or withheld, thus creating an unbalanced inventory situation that has forced some plants to close for want of wastepaper.

Alleviation of this dangerous condition is expected to follow the latest understandings, which were reached at a meeting with the twenty-seven large consuming companies on August 22.

### Mills Agreeing to Government Plan

Names of the Eastern companies agreeing to the emergency diversion of supplies follow: Fort Orange Paper Company, New York; New Haven Pulp and Paper Company, New Haven, Conn.; Robertson Paper Box Company, Montville, Conn.; United States Gypsum Company, Chicago; Container Corporation of America, Manayunk, Pa.; United Paperboard Company, New York; Congoleum Nairn Company, New York; S. Austin Bicking Paper Manufacturing

*(Continued on page 48)*

# Hammermill Paper Co. Agents Meet at Erie

## Effect of National Defense Emergency Important Among Topics Discussed At Thirtieth Annual Conference—Bruce Barton, Former Congressman From New York, Analyzes International Situation.

The national defense emergency's effect on the paper industry and the Hammermill Paper Company's efforts to meet present demands with high quality products were important among the topics discussed at the Thirtieth Annual Conference with Hammermill agents. The conference, held in Erie, Pa., August 20, 21, and 22, was attended by more than one hundred and thirty paper merchants representing all sections of the United States and two foreign countries, China and Java.

### Norman W. Wilson Presides

Business sessions at the conference were held on Thursday and Friday mornings at the Kahkwa club with Hammermill's president, Norman W. Wilson, presiding on both days. Following Mr. Wilson's opening address, talks were given by Bruce Barton, widely known advertising man, writer and former congressman, Donald S. Leslie, Hammermill's first vice-president and assistant general manager, and Harrison R. Baldwin, vice-president in charge of sales.

Bruce Barton analyzed the international situation and the events which led to the present European crisis. He gave a graphic picture of the problems that face America in this emergency, and expressed his confidence that the United States would come out of the controversy a leader and the strongest and best defended country in the world.

Mr. Leslie gave a brief summary of what is happening in the paper and pulp industry today and what Hammermill is doing to meet the huge demands for paper during the emergency. Mr. Leslie also spoke in detail about Hammermill's continuous mill improvement and modernization program and he pointed out how this has increased Hammermill's productive capacity.

Mr. Baldwin's address on the sales activities of Hammermill during the coming year was supplemented by charts tracing trends in the sales of Hammermill lines. Mr. Baldwin presented sales achievement certificates to top-ranking Hammermill agents.

### Advertising Helps for Agents

Headlining the meeting on Friday morning was an address by A. Ellis Frampton, Hammermill's advertising manager and assistant general sales manager. Mr. Frampton showed Hammermill's advertising help for its agents. He outlined the advertising program for the ensuing year and how it will function to support Hammermill agents in the future.

J. Fred Wuenschel, Hammermill district sales manager for the Pacific Coast, reported on activities at the Grays Harbor Pulp and Paper Company at Hoquiam, Wash. He reviewed the production records that are being established by this mill.

Special mill inspection trips were conducted on both Wednesday and Thursday afternoons during which the agents viewed at first hand new equipment and recent developments at Hammermill.

### Advisory Committee Meets

A meeting of the Agent's Advisory Committee was held on Wednesday at Weigelia Lodge, the country home of President Norman W. Wilson. Committee members in attendance were Chairman A. W. Green, Green & Low Paper Company, New York; T. H. Epes, Epes-Fitzgerald Paper Company, Richmond; Victor E. Hecht, Zellerbach Paper Company, San Francisco; E. L. Walters, Western Paper Company, Omaha; R. M. Harris, The Alling & Cory Company, Rochester; A. D. Cleveland, E. C. Palmer & Co., Ltd., New Orleans; George S. Clark, Hudson Valley

PICTURE TAKEN AT THE 30TH ANNUAL CONFERENCE OF THE AGENTS OF

Paper Company, Albany; Frank P. Leslie, the John Leslie Paper Company, Minneapolis; W. N. Stetson, Jr., Storrs & Bement Company, Boston; and J. P. Cunningham, Bradner Smith & Company, Chicago.

The following Hammermill agents were elected to the advisory committee to replace members whose terms have expired: W. N. Gillett, Chicago Paper Company, Chicago; H. F. Petrequin, The Petrequin Paper Company, Cleveland; and Frank W. Holden, the Rourke-Eno Paper Company, Inc., Hartford.

Newly elected members of the Agent's Advertising Committee are: S. B. Gaines, the Capital City Paper Company, Springfield, Ill.; Ernest C. Mead, Richmond Paper Company, Inc., Richmond; and R. W. Roehm, Beecher, Peck & Lewis, Detroit.

### Recreational Features

Both Thursday and Friday afternoons of the conference were devoted to golf competition and various other competitive games. The visiting agents competed for prizes furnished by Hammermill, and the Hammermill men played for prizes donated by the agents.

The E. R. Behrend Golf Trophy, presented annually to the agent with lowest net score during the Thursday afternoon play, was won this year by Mr. Frank W. Holden of the Rourke-Eno Paper Company, Hartford, Conn.

## Camas Paper School

The June issue of "The Years of Paper", published by the Crown Zellerbach Corporation, 343 Sansome street, San Francisco, Cal., gives many interesting facts of the activities of the Camas Paper School.

This school is conducted at the Camas mill of the Crown Zellerbach Corporation, at Camas, Wash. It has been called "America's most unique university", and is conducted for employees who are desirous of broadening their knowledge of the paper industry.

The Camas school held its first classes in 1933, and susbequently school terms have been held each year, from October to February. Students who complete the fourth year course represent employees with a thorough knowledge of all phases of pulp and paper manufacture.

## Job Evaluation

A "Manual of Job Evaluation," presents the procedure of job analysis and appraisal. The authors are Eugene J. Benge, management engineer, Samuel L. H. Burk, chief job analyst of the Atlantic Refining Company, and Edward N. Hay, personnel officer of The Pennsylvania Company. The book is published by Harper & Brothers, 49 East 33rd street, New York, at $3 a copy.

This text is primarily an exposition of job analysis and its evaluation by the procedure known as "factor comparison." The text adheres closely to that method. It is not a treatise on wages but presents progressive instructions for the installation of a systematic wage and salary program.

Executives and workers should find in this book authoritative information of value in arriving at a just appreciation of the underlying facts present in differences between management and labor, particularly in the equitable settlement of wages and salaries.

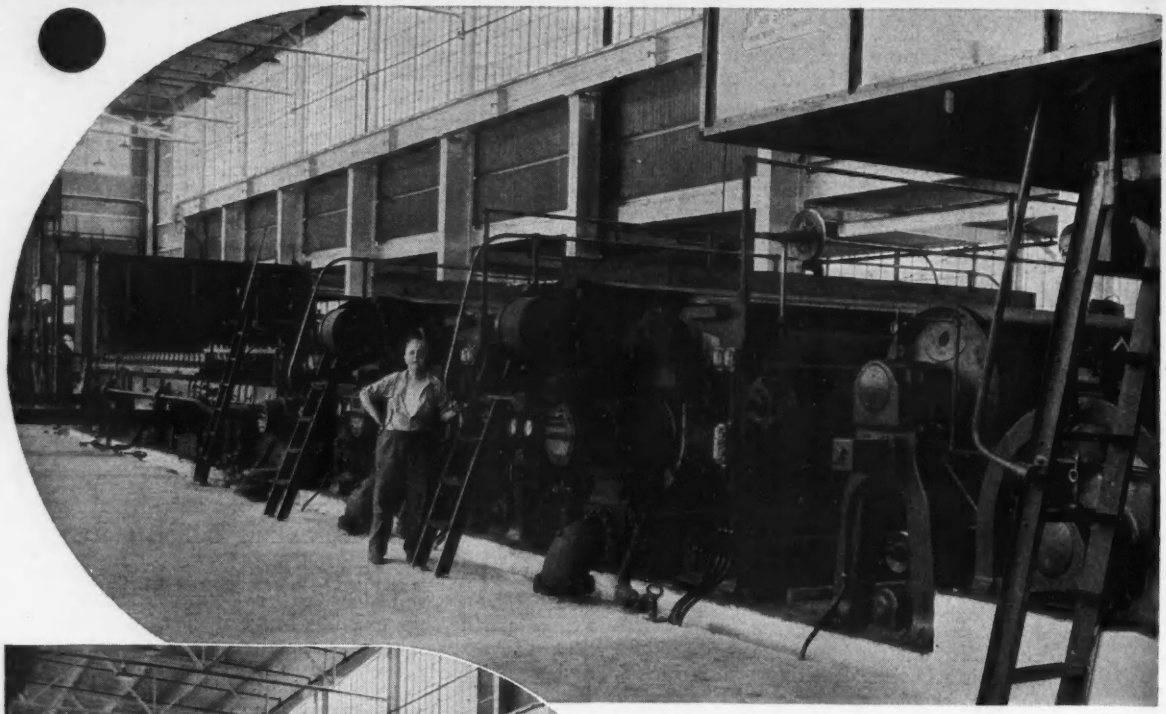
Part one, describes job evaluation systems, with a consideration of the purposes of wage and salary administration, its history and the principal methods of evaluating jobs. The factor comparison method is explained in part two, with suggestions on obtaining facts valuing and classifying jobs, and pricing the wage-scale. In part three, general considerations on wage and salary administration is presented, with a chapter on job evaluation under collective bargaining. The outlook is considered and a bibliography and index completes the book.

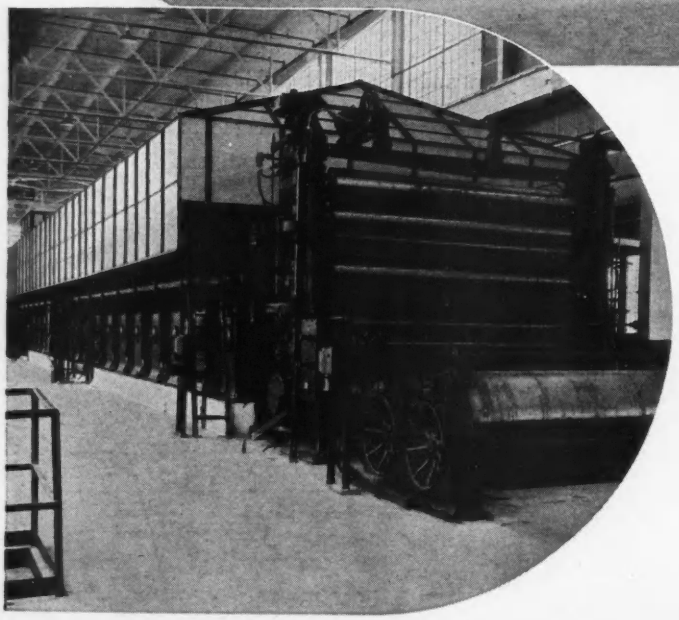
## To Demolish Edsell Mill

PHOENIX, N. Y., September 2, 1941—A certificate has been filed with the County Clerk showing a partnership existing between Charles Cosilman and David Sutherland for the demolition and salvaging of the factory in this city known as the Edsell Paper Mill. The plant has not been in operation for several years and the owners decided that it would be to their advantage to demolish the structure. The wrecking firm does business under the name of Cosilman & Sutherland.

THE HAMMERMILL PAPER COMPANY, AT ERIE, PA., AUGUST 21-22, 1941

# It's BLACK-CLAWSON at





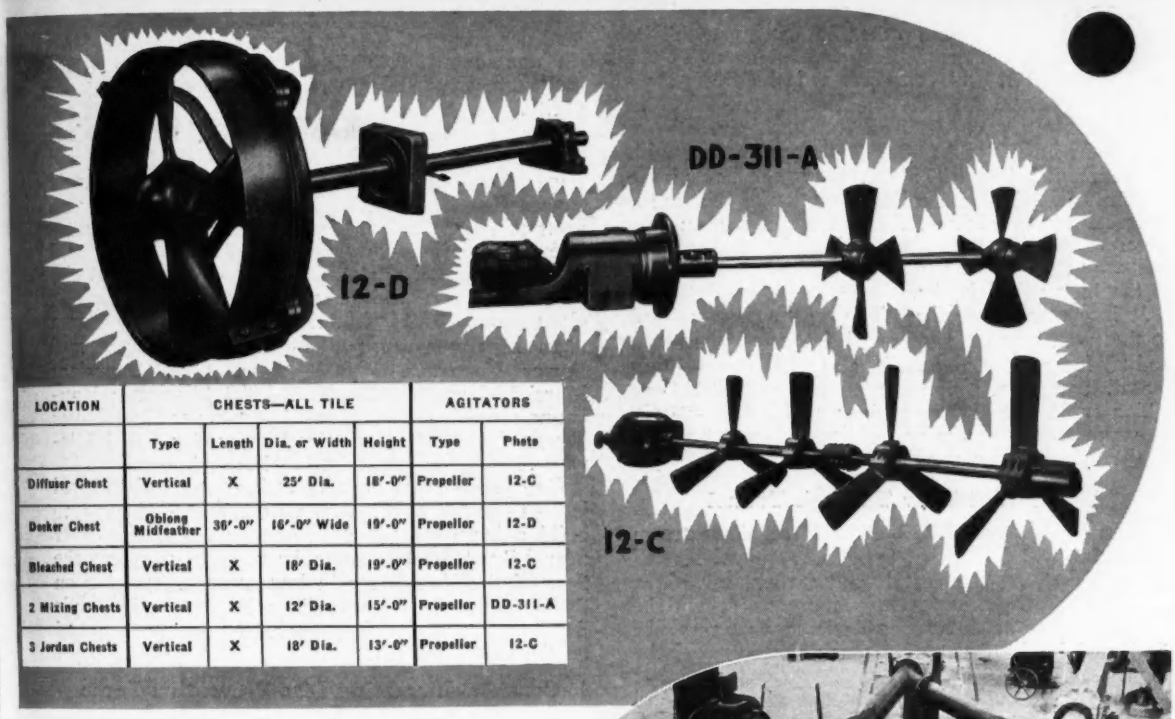
● The new machine shown above and at left was built and erected by Black-Clawson. It is designed for speeds from 200 to 1,000 f.p.m. Features include a Black-Clawson removable Fourdrinier, a Bertram type shake, one suction couch, two suction presses, two dryer sections with a smoothing press between, an eight roll Black-Clawson calender stack, a B-C uniform speed reel, and a Cameron winder.

The Fourdrinier is designed for a wire 158" wide and 90" long. It is supported by 28, 8½" rubber covered rolls. Drives for the machine are nine sectional-drive Westinghouse motors. Dryer drainage is controlled by a Coe system.

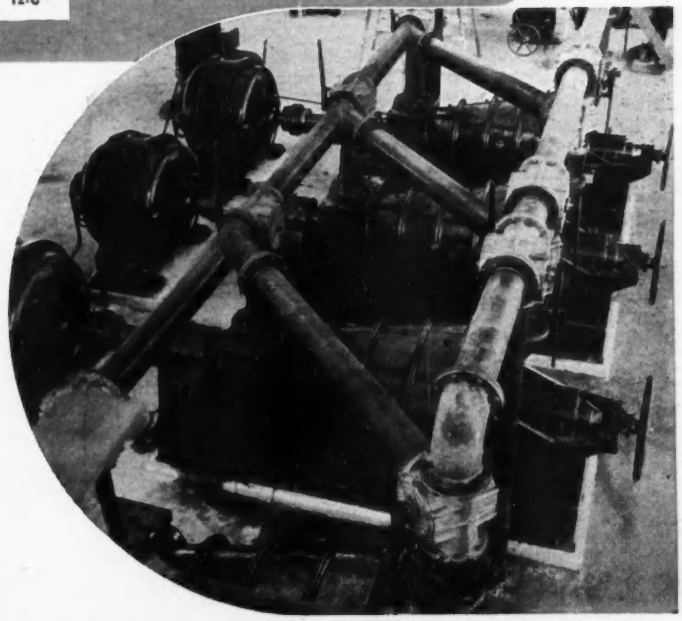
**THE BLACK-CLAWSON CO., HAMILTON, OHIO**

SHARTLE DIVISION, MIDDLETOWN, OHIO, DILTS DIVISION, FULTON, N. Y.

# FLORIDA PULP and PAPER




| LOCATION | CHESTS—ALL TILE | | | | AGITATORS | |
|---|---|---|---|---|---|---|
| | Type | Length | Dia. or Width | Height | Type | Photo |
| Diffuser Chest | Vertical | X | 25' Dia. | 18'-0" | Propeller | 12-C |
| Decker Chest | Oblong Midfeather | 36'-0" | 16'-0" Wide | 19'-0" | Propeller | 12-D |
| Bleached Chest | Vertical | X | 18' Dia. | 19'-0" | Propeller | 12-C |
| 2 Mixing Chests | Vertical | X | 12' Dia. | 15'-0" | Propeller | DD-311-A |
| 3 Jordan Chests | Vertical | X | 18' Dia. | 13'-0" | Propeller | 12-C |



● Agitator installations at Florida Pulp and Paper were Shartle engineered jobs. As can be noted by reference to the photographs and brief table above, various types and sizes of propeller agitators were involved—each specifically designed for the purpose.

At right is a battery of four Miami No. 5 jordans, each driven by a 150 H.P. synchronous motor. Due to the design of the piping, the jordans may be operated either in series or in multiple before or after the jordan stock chest which is on the ground floor. The four jordans are equipped with Bulldog fillings and X-66 bandless jordan plugs.

**THE BLACK-CLAWSON CO., HAMILTON, OHIO**

SHARTLE DIVISION, MIDDLETOWN, OHIO, DILTS DIVISION, FULTON, N. Y.

# New Link in Power Chain For Paper Mills

## Power Plant To Cost $1,500,000 To Be Erected On Michigamme River — Eight Leading Companies To Increase Capacity 25 Per Cent — Consider Increasing Fire Prevention Force — Other News.

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., September 2, 1941—Another link is being forged in an adequate power chain for Wisconsin paper mills and other industries with the announcement by the Wisconsin Michigan Power Company that it will construct a $1,500,000 power plant at Peavy Falls, on the Michigamme River in Iron County, Upper Peninsula of Michigan.

There will be a dam of multiple arch design with a maximum height of 75 feet above the bed of the stream, consisting of a spillway section, a reinforced concrete non-overflow section, an intake section, and concrete gravity walls connecting the end of the spill-way section and the intake section, respectively, to the high valley banks.

It is contemplated that the operating gross head at the plant will be between 95 feet as a maximum and 85 feet as a minimum. The ten feet representing the difference, will amount to approximately one billion cubic feet of stored water, which amount will be supplemental to the five billion cubic feet stored in the Michigamme reservoir twelve miles up river.

### Water Will Flow Through Tunnel

A power house will be built 800 feet downstream and water will be carried to it via a tunnel blasted through rock on the east bank of the river. At a point near the power house a surge tower will be installed so as to relieve any energy that must be dissipated in the event of a quick shutdown of the plant.

The power house will contain two generators and associated hydraulic and electrical equipment. Each unit will have a rated capacity of 7,500 KVA. Energy at the plant will be produced at not to exceed 6,900 volts, which will be stepped up to 66,000 volts through the use of an outdoor substation to be located immediately east of the plant.

Interconnection with the company's present system will be made at the Brule hydro-electric station, and at Randville, Mich., tying into 66,000-volt lines. Annual production will be approximately 42,000,000 kilowatt-hours.

### Dam Construction Contracted For

Contractors for the work of constructing the dam, tunnel, power house and sub-station are C. R. Meyer & Sons Company, Oshkosh, Wis., and the Bacco Construction Company, Iron Mountain, Mich. Both of these companies were engaged on construction of the Michigamme storage reservoir, completed early last spring. It is estimated that construction will continue throughout the entire year 1942.

### Expansion To Add 180,000 Kilowatts

While there is no immediate critical shortage of power in Wisconsin due to accelerated defense output, utility corporations have taken steps to assure an adequate supply by the end of 1942. A survey indicates that eight major utilities now have under construction or planned for early construction increases in generating capacity of 25%. Numerous plant interconnections also are being made for a better distribution of the load. Last year the peak load demand of the eight major utilities in Wisconsin was about 630,000 kilowatts. The expansion will add more than 180,000 kilowatts to generating capacity.

Among these projects are: The $1,500,000 hydro-electric plant of the Consolidated Water Power and Paper Company at Knowlton; Wisconsin Electric Power Company, 80,000 kilowatt expansion in two units at Port Washington, and erection of a 35,000-kilowatt unit in Milwaukee; Wisconsin Power and Light Company, 30,000-kilowatt expansion at its steam plant at Sheboygan; Wisconsin Public Service Corporation, 25,000 kilowatts at its Bayside steam plant in Green Bay; Superior Water, Light and Power Company, 10,000 kilowatts at Superior; Marchfield municipal utility, 4,000 kilowatts; Kaukauna municipal utility, new hydro unit; Clam River Power Company, new Diesel units for 6,000 kilowatts.

One project that appears to have been abandoned is that of the Wolf River Reservoir Company to build a large storage reservoir on the Wolf River near Lily, Wis. It was to be used to augment the flow of the Fox River in low seasons. The file on the case has not been opened by the Wisconsin Public Service Commission for a year and has been placed on the "inactive" list.

### Consider Increasing Fire Prevention Force

Increased personnel to prevent costly forest fires is under consideration by the Wisconsin Conservation Commission, which has 12,000,000 acres now under an intensive protection system. In the past help has been available in an organized way from numerous CCC camps in the state whose members have been engaging in reforestation and construction of roads and fire lanes. This source of help has dried up along with WPA forces in forest camps.

The commission has a permanent staff of 100 men, and another 125 on part-time and seasonal service. This force will be enlarged, and a larger voluntary group will be engaged, to respond on call for fires. Wages of volunteers have been increased from 25 to 30 cents per hour as an inducement. Rangers also are contacting chairmen of townships to instruct them as to a firefighting system, since they are designated by law to guard against fires. An entire plan will be worked out at the fall meeting of the commission.

### Students of Paper Institute in Field

Fourteen first year students of the Institute of Paper Chemistry, Appleton, Wis., will leave Monday, September 8, on a field trip in wood technology, commonly termed the "bush" course. Headquarters will be at the University of Michigan Forestry Camp at Golden Lake, Mich. The camp will continue for about ten days.

Students will study pulpwood logging operations and economics, conservation work and identification of pulp wood species. Dr. I. H. Isenberg of the Institute staff, and Calvin G. Stewart of the Kimberly-Clark Corporation, Neenah, will be co-leaders.

Students who will be making the trip, and the colleges and universities from which they were graduated are:

John Appledoorn, University of North Carolina; Walter Bublitz, University of Arizona; Joseph Clark, University of South Carolina; Donald Haggerla, Iowa State College; Arthur Haug, Marquette University; John Ireland, Ohio State University; Melbourne Jackson, Montana State College; Garry Jones, Oberlin College; Robert March, Depauw University; George Martin, Rice Institute; Charles McAleer, Armour College of Engineering; Edgar Millegan, Montana State University; Hubert Privette, University of North Carolina, and Curtis Walseth, Iowa State College.

### Paper Men Appointed by OPM

Named to the three divisional committees appointed by the Office of Production Management in Washington, D. C., are D. K. Brown, vice president of the Neenah Paper Company, Neenah, Wis.; Cola G. Parker, vice-president of Kimberly-Clark Corporation, Neenah, Wis., and J. M. Conway, president and general manager of the Hoberg Paper Company, Green Bay, Wis. They will advise defense officials on matters affecting the pulp and paper industry.

### Graef and Matchuk Nuptials

Alfred Graef of Neenah, Wis., who is project chemist for the Weyerhaeuser Timber and Pulp Company, Everett, Wash., and Miss Corrine Rutz of Appleton, Wis., were married Saturday, August 16, at St. John's church, Snohomish, Wash., by the Rev. Harold E. Cooper. Mr. Graef is a graduate of the University of Wisconsin and received his M. S. degree at the Institute of Paper Chemistry, Appleton, in 1939.

Kon Matchuk of Syracuse, N. Y., who is a chemist for Kimberly-Clark Corporation, Neenah, Wis., was married Monday afternoon, August 18, to Miss Ruth Barnes of Appleton, Wis. The ceremony was performed at the bride's home by Dr. Thomas S. Kepler of Lawrence College, where the bride was employed in the office of the dean. The couple will reside at 519 W. Summer street, Appleton.

### Nelson-Schiebler Nuptials

Harold E. Nelson and Miss Dorothy Schiebler, both of Appleton, Wis., were married Saturday morning, August 30, at St. Joseph's church at Appleton. Mr. Nelson is on the engineering staff of the Lakeview mill of the Kimberly-Clark Corporation at Neenah, Wis.

### Patent Granted to J. A. Van den Akker

A patent has been granted to J. A. Van den Akker of the Institute of Paper Chemistry staff at Appleton, Wis., for a method and apparatus for measuring the water resistance of paper. He has assigned the rights to the Institute.

Irwin A. Pearl has been named a research assistant in the organic group at the Institute of Paper Chemistry, Appleton, Wis., according to announcement of Westbrook Steele, executive director.

## Buys Paper Under Walsh-Healey Act

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., September 3, 1941—During the week ending August 16, government purchases of paper under the Walsh-Healey Act amounted to $1,359,305.39, with the following orders:

$33,009.70 worth of shipping tags for War QMC Phila., from Rayburn Manufacturing Company, Inc.; $22,525.40 worth of wrapping and typewriter paper for War QMC N. J., from Paper Corporation of U. S.; $1,019,431.56 worth of containers for War Ord. Mo., from Sefton Fibre Can Company; $23,000 worth of manifold paper for War QMC N. J., from Barton Duer Koch Paper Company; $14,181 worth of manifold paper for War QMC N. J., from Garrett-Buchanan Co.; $64,688.50 worth of stationery supp. for War QMC N. J., from Cauthorne Paper Company; $17,201.81 worth of paper bags and wrapping for War QMC N. J., from Southern Advance Bag and Paper Company, Inc.; $31,124 worth of manifold paper for War QMC N. J., from Bulkley Dunton & Co.; $12,312 worth of manifold paper for War QMC N. J., from Lee Paper Company; $58,759.42 worth of wrapping paper for War QMC N. J., from Southern Advance Bag and Paper Co., Inc.; $28,755 worth of mimeograph paper for GPO from Marquette Paper Company; $34,317 worth of book paper for GPO from Mudge Paper Company; indefinite amount to be purchased if, when and where needed, of toilet paper for Interior Dept. from Ashland Paper Mills, Inc.; indefinite, gummed tape, for Treas. Proc. DC. from George F. Muth Co., Inc.

For the week ending August 9, the government purchased $545,104.62 worth of paper under the Walsh-Healey Act, with the following orders:

$11,405.60 worth of file folders for War QMC, N. J., from Guide System & Supply Co., Inc.; $76,167.60 worth of pads, paper, for War QMC, N. J., from J. H. Weil & Co.; $11,306.25 worth of fiber boxes for War QMC, Chicago, from Mengel Company; $30,562 worth of bristol board for Treasury Eng. & Print. from Paper Corporation of U. S.; indefin. amt. paper cups for Treas. Proc. D. C. from Lily Tulip Cup Corporation; indefin. paper cups, for same, from Paper Container Manufacturing Company; (Under general schedule contract, purchases made if, when and where needed); $23,247 worth of mimeo paper for Treas. Proc. D. C. from Paper Corporation of U. S.; $10,279.17 worth of chipboard for War Ord. N. J., from Ringel Brothers; $16,524 worth of paper for War Ord, N. J., from Office Equipment Company; $35,100 worth of paper spit cups for War Med. Brooklyn, from Stone & Forsyth Company; indefin. stationery for Interior Dept. from Import Paper Company; $32,692.50 worth of stationery for War QMC N. J., from Whitaker Paper Company; $87,941.50 worth of stationery supps. for War QMC N. J., from Guide System and Supply Company; $37,100 worth of stationery for War QMC N. J., from N. Y. & Pa. Co., Inc.; $11,997 worth of stationery for War QMC N. J., from Whitney-Plover Paper Company; $88,142 worth of stationery for War QMC N. J., from Boston Paper Board Company; $13,410 worth of toilet paper for War QMC N. J., from Park Tissue Mills; $24,370 worth of stationery for War QMC N. J., from E. C. Palmer & Co.; $34,860 worth of stationery for War QMC N. J., from Riverside Paper Corporation.

# Outlook For Earnings Improves in Canada

## Indications of Better Profits This Year By Canadian Paper and Pulp Producers Seen In Current Earnings Reports of Leading Manufacturers — Vital Need of Forest Fire Protection Stressed.

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., September 2, 1941—An indication of the better fortune now attending pulp and paper enterprises is given in the declaration of the Donnacona Paper Company, Limited, of an initial dividend of 10 cents a share on the company's "A" and "B" shares, of which a total of 376,572 are outstanding, requiring a disbursement to holders of $37,657. This is the result of a sharp increase in earnings. The operating profit for the year ending December last amounted to $1,091,869 as against $776,053 in the previous year and $501,700 in 1938. The declaration is evidence that the earnings are continuing to show an increase in the present year. For 1940 the net return was at the rate of 34 cents a share, as compared with 2 cents a share in 1939. The company recently has expanded its board mill operations in line with its policy of diversifying its products so that it should not be entirely dependent on newsprint. In addition to newsprint the company produces sulphite and roundwood pulp, insulating board and various specialties.

### Bathurst Reports Indicate Upward Trend

Another announcement of the week on similar lines is that of the Bathurst Power and Paper Company, Limited, which reports that for the six months ending June 30 last net profits are estimated at $406,637, equal to $1.01 a share on 400,000 shares of class "A" stock outstanding, as compared with 85 cents per share in the first half of 1940. The announcement was made in a note accompanying current dividend cheques at the rate of 25 cents a share.

### Forest Protection Vital to Defense

Meeting in Montreal, directors of the Canadian Forestry Association have expressed great alarm at "the patent inadequacy of forest fire protection in Canada." The Association issued the following announcement:

"Government leaders have urged the importance of protection of the forests as vital to our war effort. Despite this, forest fire losses in Canada during 1941 have been the greatest in many years. In Quebec, Ontario, Alberta and British Columbia particularly the damage has been appalling.

"The primary responsibility for the protection of forests lies with the provinces as owners of the lands. There has been a definite falling down on the job. The people of Canada owe a debt of gratitude to the forest protection services in the provinces for their almost superhuman efforts this year against unusually difficult weather conditions. The plain fact, however, is that these services have never been provided with either staff or funds nearly adequate to meet their requirements. This year losses of key men to the armed forces and reduced funds have further restricted their efforts.

### Government Should Aid If Necessary

"If the provinces of their own resources cannot afford the cost of giving decent protection to our forest-estate, then the assistance of the Dominion should be secured. Canada like Nero is fiddling while one of our most important natural assets goes up in smoke. By inaction we are sabotaging our own war effort—whereas we are dissipating one of the main supports of our post war re-construction. The timber losses in 1941 would have paid the costs of effective protection of our forests for many years.

"Canadian Forestry Association directors feel that the reduction of wastage through forest fires is a real challenge to our Canadian democracies. They know that the organizing ability is there. It has been amply demonstrated in other lines of our war effort. What is needed is the realization that adequate protection of our forests is a war job—a big job and one demanding the immediate attention of both Dominion and provincial authorities."

## Blueprint Men Get Desist Order

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., September 3, 1941—The Federal Trade Commission ordered 11 producers or distributors of tracing cloths, blueprint papers and various other supplies and equipment used by the engineering, drafting and building professions, and their trade association, and several of its executive committee members, to cease and desist from a combination and conspiracy to fix and maintain prices for their products.

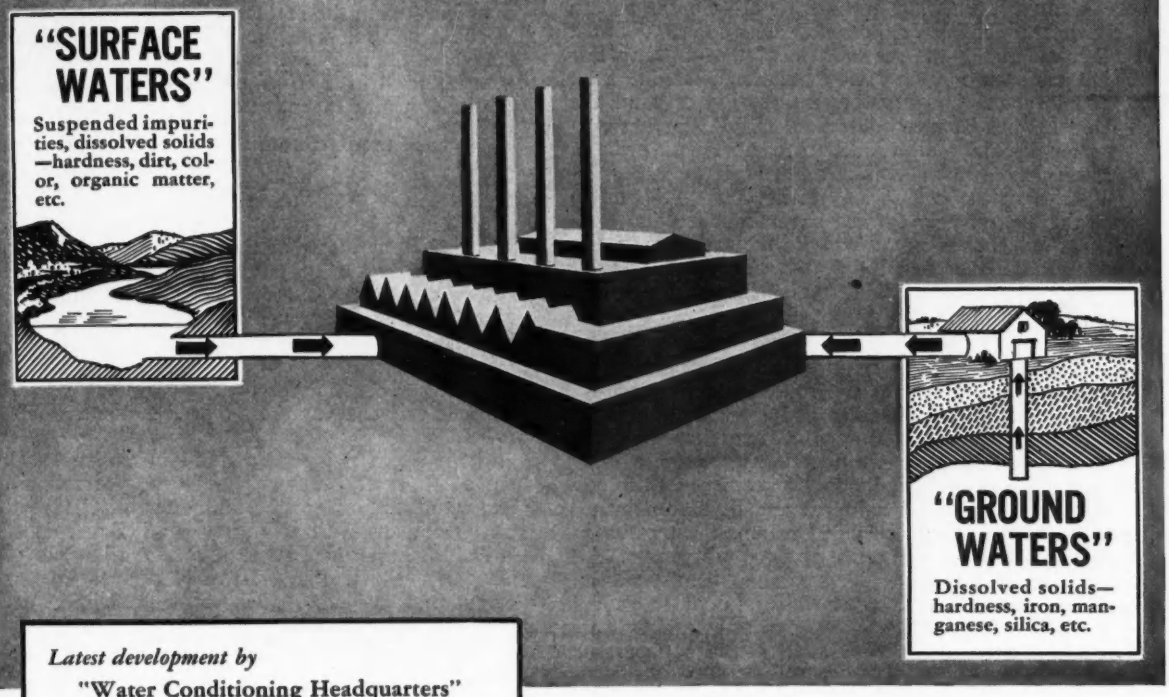
Respondents in the proceeding are: Surveying-Drafting-Coaters Sections of Scientific Apparatus Makers of America, Philadelphia; Arthur L. Parker, its manager, Paul J. Bruning, chairman, and Karl Keller, R. Fred Allin, and W. A. Berger, former executive committee members; Charles Bruning Company, Inc., New York; The Frederick Post Company, The Huey Company, Eugene Dietzgen Company, Economy Blue Prints Products, Inc., C. F. Pease Company, and United States Blue Print Paper Company, all of Chicago; Keuffel & Esser Company, Hoboken, N. J.; and Charles W. Speidel and Walter A. Kohn, trading as Chas. W. Speidel & Co., Jacob H. Weil, Edwin H. Weil, and Manfred Krauskopf, trading as J. H. Weil & Co., and Alphonse A. Brunner, trading as Keystone Blue Paper Company, all of Philadelphia.

## Get War Dept. Orders for Paper Cups

[FROM OUR REGULAR CORRESPONDENT]

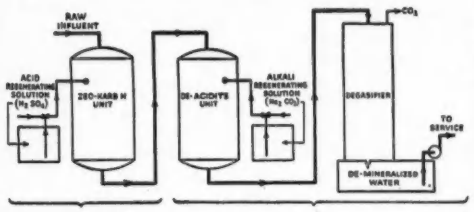
BOSTON, Mass., September 2, 1941—The War Department, through the office of the New England Coordinator of Defense, includes in its announcements of contracts not heretofore announced, awarded August 15 for the Quartermaster Corps, Medical Department, Corps of Engineers and Air Corps, one with Stone & Forsyth Company, Everett, Mass., paper cups, $27,450, and another with Burnitol Manufacturing Company, Boston, paper cups, $28,320.

# What water-impurities go into your plant?


"SURFACE WATERS"
Suspended impurities, dissolved solids—hardness, dirt, color, organic matter, etc.
"GROUND WATERS"
Dissolved solids—hardness, iron, manganese, silica, etc.

*Latest development by*
"Water Conditioning Headquarters"

## PERMUTIT PROCESS FOR DE-MINERALIZING WATER




**STEP 1**

Replacement of metallic cations by hydrogen (H ion) converts salts present in raw water into corresponding acids, viz. HCL, $H_2SO_4$, $H_2CO_3$.

**STEP 2**

Removal of acids formed in Step 1. The HCL and $H_2SO_4$ are absorbed in the Deacidite* unit and the $H_2CO_3$ decomposes into $H_2O$ and $CO_2$, this $CO_2$ being removed by a degasifier.

## Keep them out of your product . . . control process water the PERMUTIT* way

Whatever the source of your water supply, it is certain to contain impurities that endanger the quality of your product. Permutit removes these impurities, makes your water exactly as you want it. Modern Permutit equipment—more efficient, more economical than ever—insures a uniform supply of soft, clear, iron-free water, for processing or boiler feed.

**PERMUTIT'S ADVISORY SERVICE** is backed by 28 years' experience. You are invited to use it freely in working out your own water problem. Write for free booklet: The Permutit Company, Dept. I 2, 330 West 42nd Street, New York, N. Y. *Trade Mark Reg. U. S. Pat. Off.

**PERMUTIT** WATER CONDITIONING HEADQUARTERS

# Delivery to Paper Merchants More Difficult

## Chicago Expects Heavy Paper Demand During Balance of Year Will Increase Difficulty of Shipments To General Paper Merchants — Fall Meeting of N.P.T.A. Attracting Interest — Other News.

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., September 2, 1941—So far as can be determined here, Chicago markets go into the final four months of the year convinced that a pretty fair job has been done in "self-regulation". Despite a lot of talk about things getting entirely out of hand, the industry has balanced defense demands, current consumer demand and production together with price in as efficient a manner as any other of the major industries in the country. Without doubt, 1941 is to be the biggest year for the paper industry and local paper executives are warm in their praise of the American Paper and Pulp Association, the National Paper Trade Association, National Paperboard Association and affiliate groups for their work in injecting sanity into the procedure.

Demand in the next four months is expected to keep Chicago merchants confronted with the problem of how to get merchandise and sales representative with the equally harassing problem of how to get it for the merchants. Price quotations are exceedingly hard to pin down as individual concerns fight through a maze of orders, curtailment and defense demands with knowledge that curtailed volume must result in stiffer prices or complete absence of profits. All grades, krafts, sulphites, books, covers, bonds, ledgers, board, groundwoods, newsprints and waste papers are busy trying to fill orders and that about characterizes the current situation as September turns the corner.

### Paper and Twine Club Meeting

Several new members will greet the Paper and Twine Club which will hold its annual luncheon on September 16 at the Stevens Hotel, during the fall meeting of the National Paper Trade Association. Included in the group will be at least one Illinoisan in the person of Sidney V. Cain of the Cain Paper Company, Peoria, Illinois. Other newcomers are from cities in the middle west. A Chicagoan, Henry Borchardt of the Pilcher-Hamilton Company, has gotten together some interesting entertainment for the luncheon period and the speaker is to be R. M. Macy of the Paper and Pulp section of the Office of Price Administration and Civilian Supply. The importance of Mr. Macy's discussion, which will center around the position of the paper industry in the defense program, is expected to draw a record crowd.

### N.P.T.A. Meeting a Record Breaker

Chicago paper executives are getting genuinely worked up over the coming fall meeting of the National Paper Trade Association which will get under way at the Stevens Hotel on September 15. Not only are the many exhibits already announced so very attractive, but the paper merchants here are quite well aware of the organized job the industry must do if it is to preserve its identity—and everyone expects the Fall meeting to go a long way in helping develop close cooperation on all sides. Some idea of the reliance placed on the N.P.T.A. in this time of stress is noted in the recent affiliation of the Chicago Paper Association with the N.P.T.A. This affiliation brings an impressive list of Chicago paper merchants, headed by S. S. Weil, into close cooperation with other paper executives.

### Salesmen Announce Golf Winners

The August golf outing of the western division of the Salesmens Association of the Paper Industry turned out to be a red letter event despite the fact that the 37 in attendance constituted the smallest number yet on hand for these monthly affairs. Held at the La-Grange Country Club on August 22, the event found Jack Burruss coming all the way from Crossett, Arkansas, to attend the outing to once more compete over his old home course. Jack, Albermarle executive who was in Chicago many years, is a former golf chairman and officer of the SAPEYE organization.

Ed Rolaine, Mosinee Paper Mills Company, chairman of the golf committee, reported the following prize winners: Low gross, Frank Haggerty, Haggerty Paper Company with a 77; low net (17 and under) Ed Dahl, Rhinelander Paper Company; low net (18 and over) W. A. Jones, Riverside Paper Corporation; second low net, Phil Howard, American Paper Merchant; third low net, W. W. Carr, Detroit Sulphite Pulp and Paper Company; low net, (1st nine), J. D. Dooley, Southern Kraft Corporation; low net (second nine) Gene Todd, Bermingham & Prosser Paper Company low putts (1st nine) Burt Fisher, Bergstrom Paper Company; low putts (2nd nine) M. B. Peacock, International Paper Company; high gross foursome, A. S. Harmon, Pilcher-Hamilton Paper Company; F. X. Brucker, Hartford City Paper Company; Ira Meyers, Pilcher-Hamilton and F. J. Foley, Blandin Paper Company; low net foursome, Phil Howard, Gene Todd, Don Evans, W. C. Hamilton & Sons and Dick Banks, Albermarle Paper Mfg. Co., low putt foursome, Henry Fulton, Blunden-Lyon Paper Company, Gen Lamond, Blunden-Lyon; Frank Haggerty and Courtney Reeves, Allied Paper Mills. Don Evans won the blind bogey.

### Paper Feels Priority Pinch

The Chicago newspapers are this week giving some prominence to recent developments in the paper field as a result of defense activities. Comment is made concerning the recent conference of printing paperboard folding carton manufacturers which was held at the Blackstone Hotel for the purpose of discussing ways of economizing on paper used. A committee was named to consult with the Office of Production Management, economies division to discuss these economies which, besides elimination of some of the usual carton flaps, may include use of thinner paperboard. N. A. McKenna, chief of the paper and pulp section of OPM was quoted as saying that steps to economize would prevent scarcities in many other kinds of paper.

# Quick Relief from "Pumping Grief"

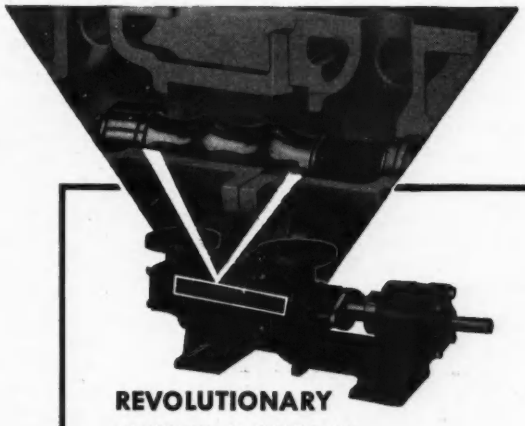
"We aren't getting production, Watkins. Where's the bottleneck?"
"It's the pumps. Just won't stand up. We'd better look at this new R & M Moyno."

## with the R & M MOYNO PUMP

You can eliminate "pumping headaches" . . . stop costly delays . . . protect the quality of your product by installing R & M Moyno Pumps.

The R & M Moyno Pump has a successful service record in dozens of leading paper mills. It is valveless . . . self-priming . . . positive in displacement . . . delivers a steady, even discharge with minimum turbulence. It will handle size and stock, even paper coating up to 53% solids, smoothly and uniformly. There are no oily or exposed surfaces to contaminate the liquid. Working parts are few and simple, requiring only a few minutes for replacements or repairs—if necessary.

Let an R & M pump expert analyze *your* problem. He may help save you thousands of dollars. Write today for Folder No. 1777 for complete details on the R & M Moyno Pump.



**REVOLUTIONARY MOYNO PRINCIPLE**

The secret of the efficient, trouble-free performance of the R & M Moyno Pump is in the pumping action of the helical rotor and stator. Action is like that of a piston moving in one direction through a cylinder of infinite length.

**ROBBINS & MYERS, Inc.**

MOYNO PUMP DIVISION SPRINGFIELD, OHIO

HOISTS • CRANES • MOTORS • FANS • FOUNDED 1878

# Obituary

### Edward E. Reed

Edward E. Reed, founder and president of the Reed Tissue Corporation, of Little Falls, N. Y., died at his home there on August 23 after an operation for appendicitis. He was 73 years old.

Mr. Reed was a partner in the former firm of D. S. Walton & Co., wholesalers and manufacturers of paper, Franklin and Varick streets, New York, until ten years ago, when he founded the Little Falls concern. He was born in Fort Lee, N. J., the son of the Rev. Merritt Reed and Deborah Anne Everett Reed.

He was a former Commissioner of Recreation of East Orange, N. J., where he lived for thirty-five years. He was also a former chairman of the East Orange Republican Committee and a member of Hope Lodge of the F. and A. M. there.

Surviving are his widow, Mrs. Edna Potts Reed, whom he married in 1938 after the death of his first wife, Mrs. Flora Blanchard Reed; four children by his first wife, Mrs. Carleton C. Perine, Mrs. Alexander B. Dewar, Edward E. Reed, Jr., and Lloyd W. Reed, all of East Orange; nine grandchildren; two sisters, Mrs. Amelia Schrope, of Jersey City, and Mrs. Mary Reed Wells, of East Orange, and two stepchildren, Miss Dana Ingle, of Cleveland, and Miss Rivera Ingle, of New York.

### Mace A. Buxton

BOSTON, Mass., September 2, 1941—Mace A. Buxton, 41, New England sales representative for the Lincoln Bag Company of Chicago, Ill., and the Paramount Paper Products Company of Philadelphia, Penna., for 23 years with offices at 212 Essex street, Boston, died August 15 of a heart attack.

Mr. Buxton, who had lived most of his life in Allston, Mass., removed to 186 Waverley street, Arlington Heights, two months ago. He was born in Boston September 8, 1889, the son of Simon P and Rosa (Kemp) Buxton. He was a member of Pequosette Lodge, A. F. and A. M., in Watertown; the United Commercial Travelers, and the Old South Church in Boston.

His widow, Mrs. Ruth Lewis Buxton, and a brother, Roger K. Buxton, of Greenburg, Penna., are living.

Services were held August 18 in the Saville and Kimball Chapel, Arlington. Burial was in Harmony Grove Cemetery, Salem, Mass.

### Jasper Whiting

Jasper Whiting, 73, inventor, soldier and newspaperman, died August 18 at his home in Dublin, N. H., after a long illness.

A graduate of Massachusetts Institute of Technology, Whiting devised a method of producing portland cement from waste products in 1889 and in 1907 he invented the Whiting cell for the manufacture of chlorine gas and caustic soda, ingredients used in manufacturing paper.

In the World War he first served as a captain in the United States army signal corps and later—with the rank of major in chemical warfare service—headed a liaison commission of the British-American gas services in England.

Whiting was decorated with the Purple Heart in 1920 by the War Department. He leaves a wife. Funeral services will be held Wednesday afternoon in Cambridge, Mass., his birthplace.

### Clarence H. Kennedy

Clarence H. Kennedy, vice-president in charge of sales, of the Kennedy Valve Manufacturing Company, Elmira, N. Y., died recently in St. Joseph Hospital, Elmira, after an illness of eight months.

Mr. Kennedy graduated with degree of Mechanical Engineer from Cornell University in 1912. His entire business career was spent with the Kennedy Valve Manufacturing Company, founded by his father, Daniel Kennedy, in 1877. After working through the ranks in several factory departments, he was successively manager of the New York branch, sales manager of the company, and was vice-president in charge of sales since 1929.

### Mason B. Olmsted

Mason B. Olmsted, 43, president of the Nackie Paper Company, Milwaukee, Wis., well-known jobbers, died August 22 at Rochester, Minn., following an illness of several months.

Mr. Olmsted was secretary of the Fox River Paper Company, Appleton, Wis., for several years. He left there about ten years ago to become associated with the Crown-Zellerbach Corporation with headquarters at San Francisco, Calif.

## Sympathetic Toward Simplifications

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., September 2, 1941—Assistant Attorney General Thurman Arnold has addressed a letter to Undersecretary of Commerce Wayne C. Taylor designed to allay any fears in the minds of manufacturers that they took concerted action reducing the number of styles and sizes in the interest of national defense, they might run afoul of the anti-trust laws.

The letter indicated a sympathetic attitude on the part of the Justice Department toward simplification as developed by the Bureau of Standards. Discussions between government officials and representatives of industry had disclosed existence of doubt and misunderstanding concerning steps which industrial groups might take in this direction and this feeling was conveyed to Mr. Arnold.

His letter is viewed as clearing any doubts and uncertainties from the atmosphere so far as the position of the Justice Department is concerned and is regarded as encouragement to industry to act, in cooperation with government, toward conservation of scarce and critical defense materials wherever simplification and standardization of products will achieve this result.

## Australia To Make More Newsprint

WASHINGTON, D. C., September 2, 1941—Australia's first new government-subsidized newsprint mill, designed to cut down the country's dependence on foreign sources for its consumption of 150,000 tons of newsprint each year, began production in January.

Reports received by the Department of Commerce say it is expected to produce 27,000 tons of newsprint in the first year, with the output increased annually.

## Unions To Meet with OPM

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., August 28, 1941—Associate Director General Sidney Hillman of the OPM has invited 17 representatives of AFL unions in the paper and pulp industry to a meeting in Washington on September 4 to discuss problems arising from the curtailment of certain materials used by the industry.

The AFL officials, together with representatives yet to be named from other international unions in the industry, will comprise the OPM Labor Advisory Committee on paper and pulp.

Although labor dislocations in the industry are not expected to be severe, the union officials are concerned about other problems, such as the difficulty encountered in obtaining new machines and metal for repairs. Military necessities have also cut down the supply of chlorine used in processing certain kinds of paper. In the printing industry, shortages of lead, copper and zinc are being felt.

The AFL representatives named to the committee are:

PULP AND PRIMARY PAPER INDUSTRY

International Brotherhood of Pulp, Sulphite, and Paper Mill Workers: John P. Burke, president, Fort Edward, N. Y.; H. W. Sullivan, first vice-president, Worcester, Mass.; Fred Morris, sixth vice-president, Madison, Me.

International Brotherhood of Paper Makers: Arthur Huggins, president, Albany, N. Y.; Joseph Addy, secretary-treasurer, Albany, N. Y.; Paul L. Phillips, Camden, Ark.

Printing Trades: John B. Haggerty, chairman, board of governors, Washington, D. C. (Alternate: Boris Shishkin, American Federation of Labor, Washington, D. C.); C. V. Ernest, Baltimore, Maryland.

CONVERTED PAPER PRODUCTS INDUSTRY

International Brotherhood of Pulp, Sulphite, and Paper Mill Workers: John Sherman, fifth vice-president, Tacoma, Wash.; Harriet Wray, Bronx, N. Y.; Earl Taylor, Toledo, Ohio.

International Printing Pressmen and Assistants' Union of North America: Charles V. Ernest, Baltimore, Md.

International Brotherhood of Paper Makers: Arthur Huggins, president, Albany, N. Y.

International Brotherhood of Bookbinders: John B. Haggerty, president, Washington, D. C.

American Federation of Labor: Boris Shishkin, Washington, D. C.

PRINTING, PUBLISHING, AND ALLIED INDUSTRIES

International Typographical Union: C. M. Baker, president, Indianapolis, Ind.

International Printing Pressmen and Assistants' Union of North America: Charles V. Ernest, Baltimore.

International Brotherhood of Bookbinders: John B. Haggerty, president, Washington, D. C.

International Photo Engravers' Union of North America: E. J. Volz, president, New York.

International Stereotypers and Electrotypers' Union of North America: Leo J. Buckley, president, Bronx.

Lithographers' International Protective and Beneficial Association of the United States and Canada: William J. Riehl, president, New York.

American Federation of Labor: Boris Shishkin, Washington, D. C.

International Brotherhood of Pulp, Sulphite and Paper Mill Workers: Raymond Leon, New York.

International Brotherhood of Paper Makers: Arthur Huggins, president, Albany, N. Y.

## Less Canadian Newsprint for Australia

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., September 2, 1941—A 55% slash in consumption of newsprint by the newspaper publishers of Australia vitally affects one of the more important overseas markets open to Canadian newsprint mills. The reduction came as a result of Government demands upon the publishers to cut consumption.

Canadian newsprint manufacturers are directly affected because, under a seven-year contract, the mills in this country undertook to supply the Australian publishers with 175,000 tons annually.

The rationing plan developed out of the need to conserve foreign exchange. When the contract was made it was agreed to pay for the paper in United States funds. Several months ago the agreement was voluntarily amended whereby payment was made in Canadian funds. Apparently the latter concession was not effective enough, or the need grew more urgent, and a plan of curtailment of consumption is now being worked out.

With 1938-39 as a base year, two plans have been prepared for rationing. The Abbott plan, submitted on June 5, provided for an over-all cut of 60% and the other plan would provide savings, plus those already affected, of 59.36% in newsprint consumption, compared with the base year. The rationing at present in force provides a saving of 57,286 tons and the above plan would bring an over-all saving of 102,757 tons.

On June 24 the Minister of Customs announced a plan designed to affect an over-all cut of 55%.

## India Restricts Newsprint Imports

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., August 30, 1941—Restriction on imports of newsprint paper has been announced by the Government of British India. Details as to the amounts which may be imported have not been received, but imports during the six months August, 1940 through January, 1941, will be used in determining quotas. The new restrictions will apply to both rolls and sheets, but the amounts to be allowed entry will be determined separately.

Exports of newsprint from the United States to British India during January and February totaled 2,039 short tons, or one-third the 6,103 tons exported during the entire year of 1940. The latter in turn were 18 fold larger than the average annual exports during the five year period 1935 to 1939, inclusive.

British India formerly depended upon Germany and Norway for the bulk of its newsprint requirements. With the invasion of Norway in April, 1940, and the closing of the Skagerrack to shipping, imports from European sources were entirely shut off and newsprint consumers since that time have had to look to the United States and Canada for their supplies. Since India produces no newsprint, the above action has undoubtedly been taken to conserve the country's dollar exchange.

## Present Ambulance to Britain

Advices have been received in New York that the ambulance, an illustration of which is presented herewith and which was donated to Great Britain by Mr. and Mrs. D. Samuel Gottesman through the American Field Service is now in active duty.

GIFT OF MR. AND MRS. GOTTESMAN, NEW YORK

The ambulance and its corps have already seen service in the humane mission of tending those who were injured and wounded in recent air raids on the British Isles.

Mr. Gottesman is president of Gottesman & Company, Incorporated, 22 East 40th street, New York.

## Floods Damage Paper Mills

Flooded rivers fed by two days of heavy rains, beginning August 31, caused 1,500 persons to flee their homes in northern Wisconsin. Approximately 15 inches of rain fell over the week-end. The crest of the Wisconsin river passed through Wisconsin rapids Tuesday afternoon at the height of 11½ feet. Work was halted on a new 1,000 foot section of the dam under construction for the Consolidated Water Power and Paper Company.

Twenty seven bridges were washed out and several dams were undermined. The Wisconsin river lowlands were flooded by the failure of a dam near Wausau. Extensive damage, estimated on September 1 at $100,000, was reported at the plant of the Wausau Paper Mills Company at Brokaw, where an earthern dam was carried away and the walls of the machine and generating rooms were undermined.

The damage to industrial plants, homes and places of business is reported to run into millions of dollars. No estimate of the amount of damage to paper mills on the Wisconsin river is available at this date.

## Plans for Paper and Twine Luncheon

Henry Borchardt, of the Pilcher, Hamilton Company of Chicago, chairman of the committee of arrangements, announces that the annual fall luncheon of the Paper and Twine Club will be held in the Tower Ballroom of the Stevens Hotel, Chicago, 1:00 P. M., Tuesday, September 16. The committee has prepared an unusually attractive program of entertainment to be given during the luncheon hour. The principal speaker will be Robert M. Macy who is price executive of the Paper and Pulp Section of the Office of Price Administration and Civilian Supply of Washington, D. C. The price of the luncheon will be $2.75 per person.

## New Johnson Water Control

A new system of multiple boiler water control, that maintains safe and proper water levels in two or more boilers with just one boiler feed pump, has been announced by the Johnson Corporation, Three Rivers, Mich. Each boiler water level is controlled separately, and water added independently of the other boilers, as the need arises. The system is electrically controlled, completely automatic in operation. Construction is simple, insuring dependable operation and making installation easy.

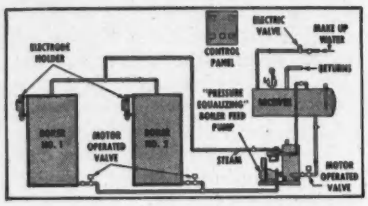



DIAGRAM OF JOHNSON CONTROL

This new multiple boiler water control is suitable for pressures up to 150 lbs., for all boilers up to 250 hp. It can be used with any type of steam or motor driven boiler feed pump. It can also be arranged with a duplicate "stand by", or emergency, pumping unit. An auxiliary condensation receiver is installed behind the pump—equipped with another Johnson water level control that automatically adds make-up water to the system as needed.

The diagram shows the Multiple Boiler Water Control as used with the Johnson "Pressure Equalizing" Boiler Feed Pump. In this pump boiler pressure is admitted to the suction side of the pump during its operating cycle, equalizing pressure at the pump inlet with boiler pressure, just as it is done in a return trap. As a result it is not necessary to pump against boiler pressure, but merely to lift the water against the low static head. This operating principle also enables the pump to handle condensate at higher temperatures without danger of vapor locking.

## Heating and Air Conditioning Guide

The American Society of Heating and Ventilating Engineers, 51 Madison avenue, New York, N. Y., has recently issued its 1941 (Vol. 19) Heating, Ventilating and Air Conditioning Guide which is obtainable from the Society at $5.00 per copy. This eleven hundred page volume is prepared and reviewed annually by members of the Society and experts in the fields covered.

A listing of some of the chapters will give a fair idea of its contents. These include thermodynamics of air and water mixtures, heating and cooling load calculations, combustion and utilization of fuels, chimney and draft calculations, steam heating systems, pipe fittings and welding, unit heaters and humidifiers, heat transfer surface coils, spray equipment, air cleaning devices, fans, instruments and test methods, industrial air conditioning, drying systems, radiant heating, water supply piping and water heating, terminology, stoker classification, etc.

It is a well prepared book as might be expected, considering that it is the nineteenth consecutive revision. It is well illustrated with tables, graphs and drawings and contains an advertising section that is highly instructive.

## Eli deVries Heads Parsons & Whittemore

Eli deVries, for the past year vice-president of Parsons & Whittemore, Inc., 10 East 40th street, New York, has been elected president of that long established concern.

Mr. deVries who had been connected with the paper business in Europe for over thirty years was a well known manufacturer and distributor of Amsterdam, Holland. He came to this country in June,

ELI DE VRIES

1940 with the intention of opening a paper exporting business under his own name. Instead of doing so he joined Parsons & Whittemore in August, 1940.

Mr. deVries is married to an American woman who is a native of Chicago and he expects to become an American citizen in August, 1942.

Howard Whittemore, who organized the concern with the late William H. Parsons and who has served as president since January 24, 1923, has resigned that office to become chairman of the board of directors.

Officers elected at the August 25 meeting are as follows: Howard Whittemore, chairman; Eli deVries, president; E. R. Southouse, first vice-president; William Flohr, vice-president; C. W. Harch, secretary-treasurer.

## Newsprint Prices Unchanged

MONTREAL, Que., September 2, 1941—Canadian International Paper Company and International Paper Sales Company, Inc. have advised their domestic customers that there will be no change in International's standard contract prices for newsprint for the remainder of this year and the first quarter of 1942. Current prices of International which are now fixed through September, 1941 have been extended at the present level until April 1, 1942.

## Lydall & Foulds Close for Repairs

MANCHESTER, Conn., August 25, 1941—The establishment of Lydall & Foulds Paper Company, Inc., shut down August 16 for three weeks in order that changes might be made in the boiler plant. The concern manufactures plain and news lined chip board and book lined and vat news lined chip board.

## New Literature

Glass-lined pipe and pipe fittings are described in Catalogue No. 101, issued by Glascote Products, Inc., 20900 St. Claire avenue, Cleveland, Ohio. The glass used is resistant to all acids in any concentration, low or high temperatures, except acids not normally used in glass-lined equipment, such as hydrofluoric acid and hot phosphoric acid. Pipe and fittings are joined with loose, split malleable iron flanges with gaskets. Dimensions of pipe and fittings are included.

Centrifugal pumps, two-stage, Type U, are discussed in Bulletin W-304-B2, issued by the Worthington Pump and Machinery Corporation, Harrison, N. J. Constructional features of this type pump, designed for high efficiency and low maintenance, with dimensions, capacities, heads and speeds given.

Flow meters are described in detail in Publication 3010, issued by the Cochrane Corp., 17th street, & Allegheny avenue, Philadelphia, Pa. It is a 52-page handbook of instrument application to steam, water, air, gas, viscous, volatile and corrosive fluid measurement. Detailed description is given of ten different types of instruments, including the new "Linameter," for difficult-to-measure fluids.

Corrugated expansion joints are discussed in a new catalogue issued by Zallea Brothers & Johnson, Taylor & Locust streets, Wilmington, Del. It describes packless expansion joints for all conditions. A feature is the improved expansion joint selector, which enables the selection of the proper expansion joint for almost every condition. Dimensions, types and diagrams of proper packing are included.

Long-tube, vertical evaporators, is the subject of Bulletin E100, issued by the Swenson Evaporator Company, Harvey, Ill. It covers the construction, principle of operation and application, gives typical flow sheets and shows installations in kraft mills.

Air-operated controllers for temperature, pressure, flow, liquid level and humidity, are described in detail in Catalogue No. 8903, issued by The Brown Instrument Company, Wayne & Roberts avenue, Philadelphia, Pa. It discusses automatic control of industrial processes and the Brown "Air-O-Line" controllers and accessories.

Electrically operated, remote indicating, recording and integrating rotameters, are discussed in a new catalogue, Section 50-A, issued by the Fischer & Porter Co., Hatboro, Pa. Construction details, wiring and insometric diagrams are included. The new "Stabl-Temp" induction coil is discussed.

Hangers, shock absorbers and many other suspended devices, are described in Catalogue No. 41, issued by The Thompson Electric Company, 1101 Power avenue, Cleveland, Ohio. Chains, cables, and useful information on the operation and care of the company's hangers is included.

## Discuss Paper Sales at Stockholm

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., September 2, 1941—Sales of paper and pulp to Germany during 1941 were discussed at a meeting held in Stockholm recently with a view to concluding an agreement similar to that existing between Germany and Norway and Finland. It is reported an agreement was reached on quantities and kinds of pulp and paper and prices to be paid.

In view of the unfavorable shipping and insurance rates, Swedish suppliers of pulp fear they will find it exceedingly difficult to compete in South American and other markets with pulp from North America.

# FINANCIAL NEWS

### New York Stock Exchange

High, Low and Last for Week Ending September 3, 1941

| | High | Low | Last |
|---|---|---|---|
| A. P. W. | .... | .... | .... |
| Armstrong Cork Co. | 28⅝ | 28¾ | 28¾ |
| Celotex Corp. | 8⅞ | 8¾ | 8¾ |
| Celotex Corp., pf. | 67¾ | 67¾ | 67¾ |
| Certain-Teed Products Corp. | 3⅝ | 3½ | 3⅝ |
| Certain-Teed Products Corp., pf. | 33¾ | 31¾ | 32 |
| Champion Paper & Fibre Co. | 22½ | 21¾ | 22½ |
| Champion Paper & Fibre Co., pf. | 105½ | 105 | 105¼ |
| Congoleum-Nairn Co. | 18¾ | 18½ | 18¾ |
| Container Corp. of America | 15¾ | 15¼ | 15⅜ |
| Continental-Diamond Fibre Co. | 10 | 9¾ | 10 |
| Crown-Zellerbach Co. | 14½ | 13⅜ | 14 |
| Crown-Zellerbach Co., pf. | 88½ | 88 | 88½ |
| Flintkote Co. | 15¼ | 14¾ | 15⅛ |
| Robert Gair | 2⅛ | 2 | 2⅛ |
| Robert Gair, pf. | 10⅞ | 10 | 10⅛ |
| International Paper & Power Co. | 19⅞ | 17⅝ | 17¾ |
| International Paper & Power Co., pf. | 71 | 68½ | 68¾ |
| Johns-Manville Corp. | 69 | 67½ | 68¼ |
| Johns-Manville Corp., pf. | .... | .... | .... |
| Kimberly-Clark Corp. | 30 | 30 | 30 |
| MacAndrews & Forbes | 26½ | 26 | 26½ |
| MacAndrews & Forbes, pf. | .... | .... | .... |
| Masonite Corp. | 26½ | 24⅞ | 26½ |
| Mead Corp. | 9⅜ | 8¾ | 9⅜ |
| Mead Corp., pf. | 70 | 70 | 70 |
| Paraffine Companies, Inc. | .... | .... | .... |
| Paraffine Companies, Inc., pf. | .... | .... | .... |
| Rayonier, Inc. | 15¼ | 15¼ | 15¼ |
| Rayonier, Inc., pf. | .... | .... | .... |
| Ruberoid Co. | 19 | 18½ | 19 |
| Scott Paper Co. | 38½ | 38 | 38¼ |
| Scott Paper Co., pf. | 112¾ | 112¾ | 112¾ |
| Sutherland Paper Co. | 20¾ | 20¾ | 20¾ |
| Union Bag & Paper Corp. | 11⅜ | 11⅛ | 11⅜ |
| United Paperboard Co. | 3¾ | 3¾ | 3¾ |
| U. S. Gypsum Co. | 59½ | 58½ | 58⅞ |
| U. S. Gypsum Co., pf. | 179 | 179 | 179 |
| West Virginia Pulp & Paper Co. | 19¾ | 19½ | 19¾ |

### New York Curb Exchange

High, Low and Last for Week Ending September 3, 1941

| | High | Low | Last |
|---|---|---|---|
| American Box Board Co. | .... | .... | .... |
| Brown Co., pf. | 24 | 22½ | 23¾ |
| Great Northern Paper Co. | 40 | 40 | 40 |
| Hummel-Ross Fibre Corp. | .... | .... | .... |
| National Container Corp. | 10½ | 10⅜ | 10½ |
| St. Regis Paper Co. | 2⅜ | 2⅛ | 2⅜ |
| St. Regis Paper Co., pf. | 109½ | 108½ | 109 |
| Taggart Corp. | 3 | 2¾ | 3 |

## Crown Zellerbach Earns 70 Cents

The Crown Zellerbach Corporation and its subsidiaries reports that in the quarter ended on July 31 they had made a slight improvement in earnings despite higher labor and material costs and increased taxes. The report, released for publication today, shows a consolidated net profit of $2,251,726, which was equal, after preferred dividends, to 70 cents a share on the 2,261,199 common shares. For the three months ended with July, 1940, the net was $2,244,315, or a little less than 70 cents a common share. The latter figure varies from the previously published result because of adjustments of provision for United States Government and Canadian taxes on income recorded subsequent to that date as a result of the new Federal and Dominion of Canada enactments.

All of the company's domestic plants were operated at capacity and in excess of normal operating time throughout the quarter, and consolidated net sales showed an increase to $19,964,477 from $17,094,979 for the July quarter a year ago. The consolidated profit before deduction of taxes on income showed an increase to $4,365,081 from $3,852.345

St. Helens Pulp and Paper Company, reports for the six months to June 30, a net income of $306,448, equal to $1.53 each on 199,934 shares.

## West Virginia Nets $1.99

The West Virginia Pulp and Paper Company and subsidiaries report a net profit for the nine months ended on July 31 of $3,382,624 after depreciation, depletion, interest, amoritization and $1,294,500 provision for taxes, including $176,500 for Federal excess profits tax.

After allowing for dividend requirements on the 6 per cent preferred, the result is equal to $2.97 a share on 902,432 common shares, and compares with $2,497,463, or $1.99 a common share, for the nine months ended with July, 1940, after provision of $393,050 for Federal income taxes. The company's fiscal year ends on October 31.

## Rayonier Earns 57 Cents

Rayonier, Inc., reports consolidated net profit of $834,983, equal to 57 cents a common share, for the three months ended on July 31, compared with $1,085,552 or 80 cents a common share in the 1940 period. An increase in sale of paper grade pulp made up for a drop in dissolving pulp sales, while an increase in domestic sales balanced to a large extent a decline in exports. The company reported it was operating at capacity.

## National Container Profits Up

The National Container Corporation and subsidiaries for the six months to June 30 report a net profit of $455,549, equal to $1.37 each on $330,482 shares of capital stock, compared with adjusted net of $477,862 or $1.44 a share last year. Profit before Federal normal and excess profits taxes was $792,899, against $710,527 last year. Net sales totaled $4,259,681, against $3,564,242.

## Government Paper Bids

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., September 3, 1941—The Government Printing Office has received the following bids for 52,650 pounds of 50% rag, 24 x 38" white ledger paper; Mudge Paper Company, 15.9 cents; R. P. Andrews Paper Company, 16.4 cents; and Baxter Company, 16.38 cents.

## Pulp Prices Announced

Rayonier Inc. announces that current prices on its regular grades of paper, specialty and dissolving pulps for the domestic market will remain unchanged for the fourth quarter of this year, from October 1 to December 31, 1941.

## Southern Advance Nets $308,741

The Southern Advance Bag and Paper Company for the seven months to July 31 reports a net income of $308,741, and net sales of $4,344,354.

# CONSTRUCTION NEWS

**Milford, N. J.**—The Riegel Paper Corporation, manufacturer of glassine, greaseproof and kindred processed paper stocks, has acquired the former local mill of the Tirrell Brothers Silk Corporation, idle for some months past, and will improve and occupy for expansion in storage and distributing divisions.

**Chicago, Ill.**—The Bernard Paper Company, 2318-20 South Western avenue, manufacturer of corrugated and other paper boxes and containers, has arranged for lease of building at 349-57 North Central Park avenue, consisting of a one and part two-story structure, totaling about 20,000 square feet of floor space, and will improve and equip for expansion. Charles D. Bernard is head.

**Plymouth, Wis.**—The Cleveland Container Company, manufacturer of paper boxes, cans, tubes, etc., fiber drums and kindred products, has work under way on new addition to local plant, previously referred to in these columns, and expects to have the structure ready for service in the fall. It will be one-story, about 104 x 175 feet, and used primarily for storage and distribution. Cost is reported close to $60,000, with equipment. Peter Walling, Plymouth, has the general erection contract. E. A. Stubenrauch, 708 Erie avenue, Sheboygan, Wis., is architect. Main offices of company are at 10630 Berea road, Cleveland, Ohio.

**Avery, Ohio**—The Weaver-Wall Company, 3700 Brookpark road, Cleveland, Ohio, roofing papers, etc., has plans under way for the installation of a new waste-treatment plant at mill at Avery, and will carry out work early in the fall. No estimate of cost announced. Floyd Brown, Marion, Ohio, is consulting engineer.

**Los Angeles, Calif.**—The Anchor Paper Manufacturing Company, recently organized with capital of 2500 shares of stock, no par value, plans operation of a local converting plant for the production of a line of general paper goods. New company is headed by G. F. Thagard, South Gate, Calif., and W. A. Lunday, Bell, Calif. It is represented by W. DeF. Mann, Title Guarantee Building, Los Angeles, attorney.

**Laurel, Miss.**—The Masonite Corporation, manufacturer of insulating board and other wood pulp board products, has approved plans for a new one-story addition to mill, continuing its expansion program, previously referred to in these columns. New unit will be used as grading building and will be of steel frame type; award for structural steel has been made to Ingalls Iron Works Company, Birmingham, Ala. It will provide for large capacity and is reported to cost over $85,000 with equipment. Superstructure is scheduled to begin at once. Company has begun operations at its new steam-electric generating station, lately completed and formerly referred to in these columns, and will develop full capacity at once. The plant is gas-fired, and has a rated capacity of 13,500-kw., or about 3500-kw. above present mill requirements, which will be available for other local service in vicinity of the plant. Work is in progress on other mill expansion, to provide for increased capacity in different production divisions, and these are scheduled to be ready for service in near future.

**Oakland, Calif.** — The National Automotive Fibres, Inc., Railroad avenue and Kennedy street, manufacturer of sisal and other fiber and allied products for automobile service, has completed plans for new addition to mill, to be one-story, 320 x 600 feet, reported to cost over $300,000, with equipment. General erection contract has been let to A. T. Beckett, 366 Fortieth street, Oakland, and work will be placed under way at once. W. H. Ellison, Pacific Building, San Francisco, Calif., is engineer.

**Marrero, La.**—The Celotex Corporation, manufacturer of box board, straw board and kindred board products, plans early rebuilding of one-story mill unit, recently damaged by fire, used primarily for storage and distributing service. Loss is reported close to $25,000, with equipment.

**Chelsea, Mich.**—In connection with one-story addition to plant of Central Fibre Products Company, Chelsea, fiber and allied specialties, recently referred to in these columns, new unit will be used for storage and distribution of materials for company machine division, and not specifically for fiber products, as previous reference indicated. It is reported to cost close to $35,000, with equipment, and is scheduled for completion at early date.

**Charlotte, N. C.**—The McNeill Paper Company, Inc., 307 East Eighth street, general paper products, wrapping stocks, etc., will take bids at once on general erection contract for proposed new one-story and basement building on North Tryon street, lately noted in these columns, to be used for storage, distribution and office service. It is reported to cost approximately $55,000, with equipment. It is expected to award contract and begin erection early in fall. Company will remove to new location as soon as new structure is ready, where increased facilities will be provided.

**Rochester, N. Y.**—The Eastman Kodak Company, Kodak Park, manufacturer of special processed papers, films, etc., has approved plans for new addition to plant, to be five-story and basement, about 50 x 60 feet, reported to cost close to $100,000, including equipment. Erection contract has been let to the Ridge Construction Company, Kodak Park, and work on superstructure will begin soon.

**Albany, N. Y.**—The Albany Felt Company, 1333 Broadway, felt products for the paper and other industries, is said to have plans nearing completion for new five-story addition to mill, about 100 x 100 feet, reported to cost over $125,000 with equipment. Structure will be used primarily for storage and distributing service.

**Ottawa, Ont.**—The Dominion Loose-Leaf Company, Ltd., 278 Sparks street, manufacturer of commercial paper products, has approved plans for new one-story plant unit, estimated to cost close to $45,000, with equipment. General erection contract has been let to Baker Brothers, Ltd., 5 Duke street, Ottawa, and work will be placed under way at once.

**Somerville, Mass.**—Fire recently damaged the building occupied by the Windsor Pad & Paper

UNITED PIGMENTS

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**A brilliantly WHITE, pure, fine titanium dioxide possessing excellent . . .**

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**UNITED COLOR AND PIGMENT CO.**

**DIVISION OF INTERCHEMICAL CORPORATION**

**NEWARK, NEW JERSEY**

**SALES OFFICES IN PRINCIPAL CITIES**

Company, 440 Somerville avenue. An official estimate of loss has not been announced. The damage will be replaced.

**Powell River, B. C.**—The Powell River Company, Ltd., Standard Bank Building, Vancouver, B. C., manufacturer of newsprint, has approved plans for new addition to mill at Powell River, to be used for expansion in sulphite pulp mill division. It will be one-story, reported to cost close to $200,000, including equipment. Erection contract has been awarded to Smith Brothers & Wilson, Ltd., 1267 Richards street, Vancouver, and work will be placed under way at once.

**Allenwood, N. J.**—The Wilsonite Products Company, Allenwood (Monmouth County), manufacturer of papier-mache products, is considering early rebuilding of plant recently destroyed by fire. An official estimate of loss has not been announced. The plant has been engaged in handling a Government contract for covers for imitation bombs used for practice service. F. W. Wilson is head.

### New Companies

**Dover, Del.**—The American Fiber Products Company, Inc., has been chartered under Delaware laws with capital of 1000 shares of stock, no par value, to manufacture and deal in fiber products of various kinds. New company is represented by the United States Corporation Company, Dover. The incorporators include J. M. Townsend and A. L. Raughley.

**Chicago, Ill.**—The Fibers Separation Processes, Inc., 105 West Adams street, has been incorporated with capital of 200 shares of stock, no par value, to manufacture fiber products under a special process. The incorporators include L. R. Krein and W. H. Henrickson.

## Shanghai Gets More Paper from U. S.

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., September 2, 1941—Shanghai, cut off by war from its normal sources in Germany and the Baltic countries, is relying more heavily on the United States for paper and paper products, the American consulate general at Shanghai reports.

Total imports in 1940 were valued at Customs Gold Units 11,651,835 with the U. S. sending about 55 per cent of the total, Canada, 14 per cent and Japan 11 per cent.

Canada leads in supplying the newsprint and other cheap printing paper. Imports of this classification last year were valued at Customs Gold Units 2,118,926, of which 56 per cent came from Canada.

Canada also competes with the United States in supplying Kraft paper. Canada sent 30 per cent of Shanghai's imports which were valued in 1940 at Customs Gold Units 667,172 while the United States supplied 64 per cent.

Ninety-two per cent of the drawing, document, bank note and bond paper received in Shanghai came from the United States in the last year, reaching a value of Customs Gold Units 612,246. Despite rigid government restrictions on Japan's export trade, that country continued to supply a large part of Shanghai's paper needs, especially cigarette paper, coated or enameled paper, packing and wrapping paper (other than Kraft), parchment, glascine and greaseproof paper.

## Conserving Men, Money, and Materials

In times like these, when industry is confronted with emergency production demands, the need for more effective accident controls in order to conserve men, money, and materials becomes of paramount importance. Plant expansion, development of new processes, maintenance of heavily worked equipment, employment of new workers, and other similar problems call for more than usual ingenuity and skill on the part of management, if a "job" is to be done not only well but safely.

These vital considerations are emphasized in a new report issued by the Industrial Safety Section of the Metropolitan Life Insurance Company. The report is entitled, "Conserving Men, Money, and Materials in Essential Industries." It is basically a discussion check list for the industrial executive concerned with emergency production.

The report lays particular stress on the proper consideration of accident costs. Of far greater significance than the threat of personal-injury accidents are the enormous potential losses of precious time and the spoilage of equally precious materials that result from mishaps sometimes termed "near accidents"—indirect losses which are generally overlooked in compiling accident reports or statistics, yet which to the production executive represent very real items of industrial waste.

As an aid to the study of industrial accidents and to point up proper means for their control, the report briefly develops several fundamental considerations for employee safety.

Copies of this report are available to executives who address the Bureau on their business stationery. Address: Policyholders Service Bureau, Metropolitan Life Insurance Company, One Madison avenue, New York, N. Y.

## Netherlands Indies Needs Mills

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., September 2, 1941—Wood pulp, wood-free writing and cigarette paper are now being turned out in Netherlands Indies in two local plants according to consular information. There is still room, however, for the production of chemical pulp and packing paper from local species of wood, the former being the raw material for rayon or artsilk manufacture. This plan offers the possibility of exploiting large areas of forest or wild timber. The required capital is estimated at 7,500,000 guilders. Investigations have progressed far, but difficulty is being experienced in the acquisition of the necessary machinery. A government expert has already come to the United States for this purpose.

## Superintendents to Meet at Green Bay

October 10th and 11th have been selected as the dates for the fall meeting of the Northwestern Division of the American Pulp and Paper Mill Superintendents' Association. Green Bay, Wisc., will be host city of the fall meeting with headquarters at the Northland Hotel.

General Chairman, H. W. Sherman, is now selecting his committee to handle details and affairs of the meeting. This personnel will be announced at a later date along with the complete business and entertainment program.


A Digester Blow-off Valve that Gives Years More Service

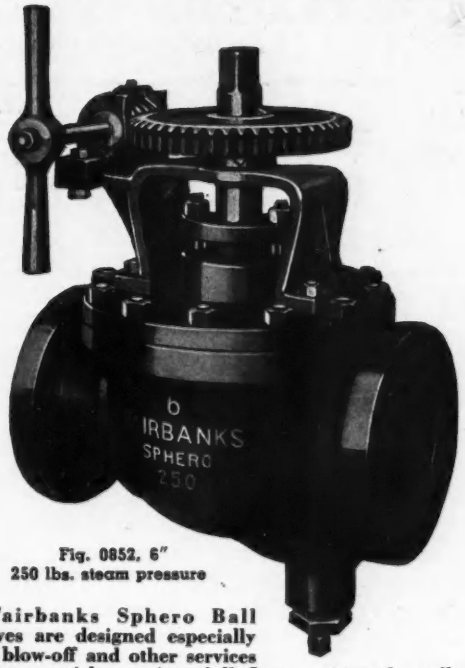


Fig. 0852, 6"
250 lbs. steam pressure

**Fairbanks Sphero Ball Valves are designed especially for blow-off and other services where a quick opening, full flow, positive shut-off valve is required.**

**On sulphate digester blow-off service, Fairbanks Cast Steel Valves with stainless steel ball and Ni-Resist seat rings are so resistant to wear that they have been in scores of paper mills for years without any replacement parts being needed.**

**Fairbanks Sphero Valves are different . . . instead of a wedge or disc there is a revolving ball plug which wipes the seating surfaces clean. The shearing action cuts through heavy solids and liquids. There is nothing on which scale or foreign matter can accumulate.**

**The opening in the ball plug is the same size as in the pipe, which eliminates frictional resistance to stream flow.**

**When seat rings or other parts become worn, they can be replaced without removing the valve from the pipe line.**

**Write for descriptive Bulletin V-103.**

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**Fairbanks Sphero Valves**

# PAPER TRADE JOURNAL

Title Reg. U. S. Pat. Off.

Henry J. Berger

EDITOR

Vol. 113 September 4, 1941 No. 10


## COMING EVENTS IN PAPER INDUSTRY

New England Section. Technical Association of the Pulp and Paper Industry—Third Friday of each month at the Roger Smith Hotel, Holyoke, Mass.

Delaware Valley Section. Technical Association of the Pulp and Paper Industry—First Friday of each month at the Engineers Club, Philadelphia, Pa.

Lake States Section. Technical Association of the Pulp and Paper Industry—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

Kalamazoo Valley Section. Technical Association of the Pulp and Paper Industry—First Thursday of each month at the Park, American Hotel, Kalamazoo, Mich.

Technical Association of the Pulp and Paper Industry, Fall Meeting, Ann Arbor, Mich., September 16-19.

National Paper Trade Association, annual Fall Meeting, Stevens Hotel, Chicago, Ill. September 15-17.

## INDUSTRIAL CHANGES

At the start of the European conflict two years ago it was generally expected that changes in international trade would seriously affect industry and trade in the United States. The dislocation of our foreign trade was the first serious change and the complete cessation of all Scandinavian exports of wood pulp was the first major change affecting the paper and pulp industry. With the declaration of an unlimited emergency and the start of the large-scale defense program, a more severe dislocation of business became apparent and today the effect of the all-out defense program is beginning to be experienced in many types of industries and trades.

The end of two years of war in Europe finds the economic situation and outlook in the United States profoundly altered, states the Guaranty Trust Company of New York in discussing American business in the current issue of *The Guaranty Survey*, "The changes," *The Survey* continues, "are due partly as a result of the inevitable industrial, commercial and financial dislocations of war-time but even more largely to the vast rearmament program upon which the nation suddenly embarked when it became apparent that developments abroad continued a greater menace to American security and interests than had been recognized at the beginning. Inasmuch as the American defense program did not get under way until after almost a year of war, the most radical changes in this country have occurred during the last twelve months. So sweeping have these changes been that the United States now finds itself in an economic position not unlike that of a nation actually at war."

In commenting on the prospect of sacrifices, the article states that, "It is doubtful, however, whether the country is yet fully awake to the implications of an unlimited national emergency. There is still a disposition in some quarters to regard the defense program not as a common task that must be accomplished by unanimous effort and sacrifice, but as an opportunity to promote the interests of certain groups at public expense. As long as this attitude persists, not only will an equitable sharing of costs be rendered impossible, but rearmament itself will be impeded and its broad economic consequences immeasurably aggravated, to the lasting hurt of the self-seeking groups, along with the rest of the community. At present the country is not far beyond the commencement of the immense task that it has undertaken. The stimulating effects of emergency demands on productive facilities have been felt, but most of the major strains are yet to appear. Priorities, price ceilings and export curbs have been imposed in numerous cases; but these restraints are of small significance in comparison with the sacrifices that will have to be made in the future. Just how great these sacrifices will be and where they will fall cannot yet be foreseen. It is obvious, however, that a country cannot abruptly divert a large share of its productive capacity from peace-time to war-time channels without serious damage to some parts of its industrial structure. And it is equally clear that the energies of the people cannot be turned from the production of the necessities and comforts of life to the production of implements of war without a corresponding decline in the standard of living."

In referring to the unprecedented demand for goods the article says in part that, "The outstanding feature of the business situation in the United States at the moment is an overwhelming demand for goods of almost all kinds. In the effort to supply these goods, industrial activity has risen to the highest level on record. The seasonally adjusted Federal Reserve index of industrial production for July stands at a preliminary figure of 162% of the 1935-39 average, as against 121 a year ago, 104 two years ago, and a 1929 peak of 114. Current estimates indicate that employment also has risen to a new high record and that unemployment has reached the lowest level in eleven years. The demand is by no means confined to war materials or to the products of the heavy industries but extends to producers' and consumers' goods in general, both durable and non-durable. The figures seem to indicate not only that demand is at a record level but also that there is a large amount of buying in excess of current requirements. All groups from the manufacturer to the ultimate consumer, influenced by expectations of higher prices, priorities, shortages or other factors, have been accumulating supplies of goods for future use. This practice has undoubtedly contributed to the appearance of shortages of some commodities and has been one of the facts underlying recent legislative proposals with respect to priorities, price control and property seizure."

Commenting on the outlook for earnings *The Survey* says in part: "A number of factors combine to create uncertainty as to whether the high rate of industrial activity will find any clear reflection in the level of business profits. In the first place, it seems clear that many branches of business, far from profiting by the emergency, will face increasingly difficult conditions owing to shortages of material and labor and to forced curtailment of demand. In the second place, business as a whole, in defense as well as non-defense lines, has experienced, and will probably experience in increasing degree as time goes on, rising costs due to higher wages and higher prices of farm products, imported commodities and raw materials in general. In the third place, excess profits taxes and other direct levies on business enterprises will go far toward wiping out any additional earnings that might normally result from the emergency demand for their products. It is an avowed governmental aim that the national emergency shall not become a source of private enrichment. As far as business is concerned, this aim is being pursued with a thoroughness that leaves little room for doubt as to its broad realization.

## Riegel Plans Housing Units

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., September 1, 1941—The Riegel Paper Corporation has purchased the George C. Stover estate farm on the Milford-Mt. Pleasant Road in Milford, where the corporation plans to erect homes for employees and their families. The building development is to start immediately with the erection of twenty or more houses. The work of surveying and laying out the site into streets and building sites by Norman Applegate, company engineer, who is being assisted by a landscape artist, is already far advanced. No two houses will be built alike and the houses will be erected under a checker-board plan so there will be vacant lots between all houses and on the opposite side of the street from each house. No two houses will face one another.

Mayor Orville B. Ziegler announced at a recent session of the Milford Council that the Riegel Paper Corporation desired Milford to take over and construct a new road, running parallel with the Milford-Mt. Pleasant Road, to the south of that highway, between the new road just completed at the Hillcrest section of town and the Milford Union Cemetery; also to provide municipal water to the new section to be developed. Borough Engineer Frank Bohren was instructed to submit plans and approximate costs for the road construction and water extension. A letter was read from the State Department of Health advising that Walter O. Pimm had passed a recent examination for the operation of water supply systems under group three, and that he also had passed the examination for fourth class operator of water treatment plants. Mr. Hoffman, Riegel Paper Corporation chemist has held a third class license for water treatment for several years, and has been acting superintendent of the Milford Water Department for some months.

## Production Ratio Report*

(Production as per cent of six-day capacity)

COMPARATIVE WEEKLY SUMMARIES

| Current Weeks, 1941 | | Corresponding Weeks, 1940 | |
|---|---|---|---|
| July 19 | 100.4 | July 20 | 91.3 |
| July 26 | 101.9 | July 27 | 87.6 |
| August 2 | 100.7 | August 3 | 87.4 |
| August 9 | 102.3 | August 10 | 87.9 |
| August 16 | 101.1 | August 17 | 84.6 |
| August 23.... (Prelim.) | *102.8* | August 24 | 84.7 |

COMPARATIVE MONTHLY SUMMARIES

| Year | Jan. | Feb. | Mar. | Apr. | May | June | July |
|---|---|---|---|---|---|---|---|
| 1940 | 89.1 | 84.7 | 82.3 | 84.3 | 90.0 | 92.1 | 85.3 |
| 1941 | 85.6 | 89.7 | 92.2 | 96.4 | 98.9 | 99.5 | *94.9* |

| Year | Aug. | Sept. | Oct. | Nov. | Dec. | Year Avg. |
|---|---|---|---|---|---|---|
| 1940 | 85.1 | 81.5 | 85.5 | 84.9 | 80.9 | 85.6 |
| 1941 | ... | ... | ... | ... | ... | ... |

COMPARATIVE YEARLY SUMMARIES

| | 1935 | 1936 | 1937 | 1938 | 1939 | 1940 | 1941 |
|---|---|---|---|---|---|---|---|
| Year to Date.. | 68.4 | 78.0 | 87.1 | 68.8 | 78.8 | 86.8 | *94.4* |
| Year Average.. | 69.9 | 80.4 | 79.8 | 71.5 | 83.4 | 85.6 | ... |

* Based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

PAPERBOARD OPERATING RATIOS†

| Year | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Year Avg. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1936 | 62 | 67 | 67 | 70 | 69 | 70 | 69 | 75 | 78 | 82 | 80 | 74 | 72 |
| 1937 | 80 | 86 | 86 | 88 | 85 | 77 | 66 | 74 | 69 | 65 | 55 | 45 | 73 |
| 1938 | 54 | 60 | 61 | 57 | 58 | 56 | 57 | 66 | 66 | 70 | 65 | 59 | 61 |
| 1939 | 60 | 67 | 71 | 69 | 64 | 67 | 63 | 72 | 74 | 84 | 81 | 71 | 70 |
| 1940 | 71 | 70 | 69 | 70 | 76 | 79 | 72 | 74 | 72 | 79 | 77 | 71 | 73 |
| 1941 | 75 | 81 | 82 | 83 | 84 | 88 | *86* | .. | .. | .. | .. | .. | .. |

Week ending July 19, 1941—92
Week ending July 26, 1941—92
Week ending Aug. 2, 1941—93
Week ending Aug. 9, 1941—91
Week ending Aug. 16, 1941—92
Week ending Aug. 23, 1941—*94*

† Per cents of operation based on "Inch-Hours" reported to the National Paperboard Assn.

## J. J. Brossard Assigned to Washington

In line with a policy to be of fullest assistance to Government in the defense emergency, John J. Brossard, vice president in charge of the Eastern Division of Container Corporation of America, at Philadelphia, has been assigned to full time duty in Washington. This move, to facilitate cooperation with all Government agencies, was announced by Walter P. Paepcke, president of the Container Corporation.

The increasing tempo of the defense program with the consequent need for paperboard and paperboard products in defense industries makes the post an extremely important one, and Mr. Brossard's intimate knowledge of the industry makes him particularly well qualified to contact all departmental executives and administrators. The move follows the suggestion by E. R. Stettinius, Jr., Director of Priorities, that manufacturers and producers specifically assign special members of their staffs to handle priority and defense matters.

Ira C. Keller, vice president of the company and hitherto in charge of the Western Container Division, is moving to Philadelphia to succeed Mr. Brossard as head of the Eastern Division.

## Issues Labor Relations Brochure

How management can meet today's crucial challenge is dramatically described in an illuminating new 12 page guide just issued by Labor Relations Institute, a non-profit organization sponsored by over 1200 industrial executives throughout the United States. "What Every Employer Should Know About Labor Relations" is the title of the brochure which is offered free to interested executives. Address Labor Relations Institute, 1775 Broadway, New York, for your copy.

# TO BETTER SERVE THE PAPER INDUSTRY WITH

# ROSIN SIZE

In considering his source of supply for Rosin Size, the buyer of sizing materials expects the concern with whom he deals to meet certain standards.

1. It should be a well-established institution — one with an outstanding reputation.

2. It should have proper physical facilities for maintaining unfailing service . . . factories and warehouses strategically located for quick and economical delivery . . . plus raw material resources such that its own supply is protected in times when productive capacities are heavily taxed.

3. It should have a group of products that meets the wide variety of conditions encountered in the Paper Industry.

4. It should have a trained manufacturing organization guided by alert control chemists and engineers so that the products will always be of uniform high standard.

5. It should energetically carry on research to enable development of increasingly improved products.

6. It should maintain a service organization of trained specialists to assist the size user to obtain the greatest value from his sizing materials.

Cyanamid Rosin Size products are made dry or liquid in various concentrations to suit any mill's particular requirements. They are available in bags, drums or tank cars at the option of the mill management. The list includes Gum Rosin Size and Wood Rosin Size. The latter is obtainable either in bright pale grades or the less costly darker sizes. All are made under strict technical control, and Cyanamid's research staff is constantly at work improving them. Experienced service men are at your call when needed. Cyanamid can supply you reliably, continuously and economically. You will enjoy many advantages of product reliability and service by joining the large group of users of Cyanamid Rosin Sizes.

Liquid Size is convenient to use and can be accurately metered into the beaters as needed.

Dry Size is economical to ship and store. It is also particularly suited for use in smaller quantities.

Cyanamid Rosin Sizes are made under strict technical control to assure highest quality and uniformity

## American Cyanamid & Chemical Corporation

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Section of the
Technical Association of the Pulp and Paper Industry

Edited by Ronald G. Macdonald, Secretary

# Solubility of Chlorine in Water

By Roy P. Whitney[1] and J. Edward Vivian[2]


## Abstract

*The solubility of chlorine in water has been determined experimentally over the ranges of temperature and liquid concentration commonly encountered in the preparation of chlorine water bleaching solutions.*

*The absorption coefficients for chlorine in water previously reported by the authors have been recalculated using the new solubility data. The effect is to raise the coefficients somewhat. However, over the range of liquor rates recommended for industrial practice, the correction is only about 10%, and since this is within the precision claimed for the absorption data, the previously presented coefficients may be used without alteration.*


In a previous paper *(4)*, Whitney and Vivian discussed the application of absorption theory to the design of industrial equipment for the production of chlorine water bleaching solutions, and presented results on the capacity coefficients of absorption for this system. It was pointed out that for the determination of these coefficients or for their use in design calculations, a knowledge of the equilibrium solubility relationships for the system is necessary.

## Hydrolysis and Solubility Data

Experimental data on the solubility of chlorine in water are few and are of little value in the range encountered in the production of chlorine water bleach from electrolytic cell gas. In their previous work, Whitney and Vivian used the solubility data of Adams and Edmonds *(1)* which were calculated from Arkadiev's equations *(2)*, using the experimental data of Yakovkin *(5)* on the hydrolysis constant for chlorine in water. Because they were calculated and not experimental, it was stated that these data should be checked by a direct method. Since that time, the solubility of chlorine in water has been determined experimentally in this laboratory over the range of temperature and concentration commonly encountered in the preparation of bleaching solutions.

## Chlorine Solubility Determination

The experimental procedure consisted essentially of the bubbling of a gas mixture of chlorine and nitrogen of constant composition through chlorine water contained in a glass cell, until equilibrium between the two phases had been reached. Then, by analysis of the liquor and of the exhaust gas, the solubility of chlorine under those particular conditions of temperature and chlorine pressure was determined.

Both gases were obtained from cylinders, and since the impurities present had no effect on the equilibrium, they were not removed. The gases passed through flowmeters which proportioned the relative amounts to maintain the desired chlorine concentration, were mixed, heated or cooled to the temperature of the experiment, saturated with water, and passed into the equilibrium cell. Gas from the cell was exhausted at atmospheric pressure through a water seal. The temperature equalizing coil, the saturator, and the equilibrium cell were all immersed in a thermostatic bath which maintained the temperature constant to within 0.05 deg. C.

## Gas and Liquid Samples Taken

Gas and liquid samples were taken in evacuated weighing bulbs. The size of the sample was obtained by weight, and the chlorine content in both cases was determined by the introduction of an excess of potassium iodide solution and titration of the liberated iodine with standard sodium thiosulphate solution. Since successive samples could be taken without disturbing the equilibrium, each experiment was continued, sampling at half-hourly intervals, until duplicate analyses indicated that equilibrium had been attained. For each run, the temperature of the bath was determined with a calibrated mercury thermometer, and the pressure in the cell was read from an absolute manometer.

Using this method, it was possible to approach equilibrium from either direction; by absorbing chlorine in the solution or by stripping chlorine from the solution. Both approaches were found to give identical results, thereby indicating the absence of supersaturation effects and the presence of true equilibrium.

The results obtained in this investigation are shown in Table I and Figs. 1 and 2.

Figure 1 shows the pressure of chlorine in the gas phase plotted against the chlorine concentration of the solution in grams per liter. In the range investigated, the effect of the deviations of chlorine from the perfect gas laws is negligible, so that the chlorine pressure may be taken directly as the volume fraction of chlorine in a gas times the total pressure.

In Fig. 2, the same data have been plotted as liquid concentration against temperature, showing lines of

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TABLE I

| Temp. deg. C. | Chlorine Pressure atmos. | Solubility g. per liter |
|---|---|---|
| 10 | 0.060 | 1.24 |
| | 0.066 | 1.31 |
| | 0.155 | 2.28 |
| | 0.157 | 2.37 |
| | 0.292 | 3.68 |
| | 0.293 | 3.66 |
| | 0.498 | 5.41 |
| | 0.498 | 5.55 |
| 15 | 0.058 | 1.11 |
| | 0.061 | 1.15 |
| | 0.140 | 1.95 |
| | 0.145 | 2.01 |
| | 0.291 | 3.30 |
| | 0.297 | 3.30 |
| | 0.488 | 4.77 |
| | 0.490 | 4.80 |
| | 0.951 | 8.25 |
| | 0.951 | 8.25 |
| 20 | 0.067 | 1.12 |
| | 0.120 | 1.60 |
| | 0.260 | 2.62 |
| | 0.260 | 2.65 |
| | 0.487 | 4.15 |
| | 0.490 | 4.22 |
| | 0.965 | 7.25 |
| 25 | 0.062 | 1.04 |
| | 0.066 | 1.06 |
| | 0.104 | 1.39 |
| | 0.109 | 1.43 |
| | 0.174 | 1.89 |
| | 0.270 | 2.46 |
| | 0.551 | 3.91 |
| | 0.589 | 4.18 |
| | 0.961 | 6.26 |

constant chlorine pressure. From this plot, a pressure-concentration plot at any intermediate temperature can easily be prepared.

Some experimental data on the solubility of chlorine in water are reported in the International Critical Tables *(3)*. A comparison of these data with those of this investigation is shown in Table II. At the four temperatures investigated, the greatest deviation is 1.1%.

TABLE II

| Temp. deg. C. | $Cl_2$ Press. atmo. | ICT Data g./liter | This Investigation g./liter | Deviation % |
|---|---|---|---|---|
| 10 | 0.989 | 9.95 | 9.92 | —0.3 |
| 15 | 0.983 | 8.49 | 8.46 | —0.4 |
| 20 | 0.978 | 7.29 | 7.32 | +0.4 |
| 25 | 0.973 | 6.40 | 6.33 | —1.1 |

A comparison of the data of Adams and Edmonds with those of this investigation is shown at one temperature in Fig. 3. The agreement is surprisingly close, particularly at chlorine pressures above 0.1 atmospheres. The one temperature shown is typical of the comparison at the other temperatures investigated.

## Equilibrium is Closely Approached

In considering the effect of these new solubility data on the capacity coefficients presented previously, it is significant that in most of the absorption tests,

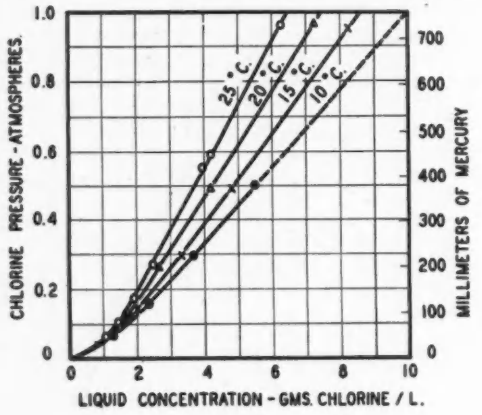


FIG. 1
Chlorine Pressure vs. Liquid Concentration at Constant Temperature

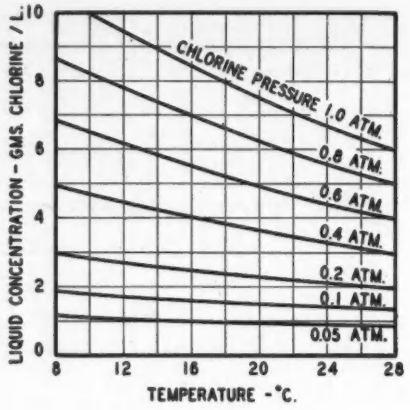


FIG. 2
Liquid Concentration vs. Temperature at Constant Chlorine Pressure

equilibrium was very closely approached. Thus small changes in the solubility data would have a magnified effect on the driving force at the bottom of the tower. It is to be expected therefore that the coefficients will be changed somewhat, and recalculation proves this to be the case. The change is in the direction of higher coefficients, and the correction varies with the liquor rate, being somewhat greater at the low rates. At a liquor rate of 1000 pounds per hour per square foot, the coefficients should be increased by as much as 40%. However, at liquor rates of from 5000 to 10,000 pounds per hour per square foot, the range in which industrial equipment should be operated, an average increase of only 10% is indicated. Since this is within the precision which was claimed for the data, the coefficients previously presented may be used in that range without correction.

Because the new solubility data are considered to be more reliable, they should be used in design calculations, but, particularly with a high chlorine concentration in the gas, no significant change in the results is to be expected thereby.

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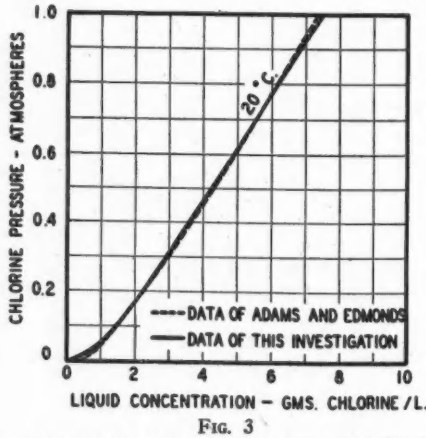


FIG. 3
Comparison of the Data of Adams and Edmonds with Those of This Investigation

# Suitability of High-Density, High-Summerwood Slash Pine for Kraft and High-Grade Papers

By Sidney L. Schwartz[1] and Mark W. Bray[2]


## Abstract

*Sulphate pulping experiments have been conducted on a particular variety of slash pine* (Pinus caribaea *Morelet) growing in south central Florida, the density and summerwood content of which is considerably higher than that grown under the more favorable sites of the southern yellow pine belt. While these particular wood variables influence both yield and quality in the kraft and bleachable sulphate pulps obtained from this material, the physical properties of the pulps were not correlatable with either springwood-summerwood ratio, wood density, or position in the tree as shown in previous researches on normal growth wood. The kraft pulps from this high-density wood were comparatively low in bursting, folding, and tensile strengths, but their coarse, bulky fibers possessed a high resistance to tear and, in addition, required only short beating schedules to develop their strength. In general, the physical properties of the bleachable sulphate pulps, although requiring longer beating schedules for strength development than the rawer cooked kraft pulps, were much superior to the latter. When bleached sufficiently for high-grade papers, these pulps retained most of their original strength. Even though the fibers of this type of slash pine are coarser than normal growth material, the results of experimental paper machine trials on the bleached sulphate pulps indicated possibilities for their use in such high-grade papers as bond.*


In nearly any pulping operation it is customary to associate pulping processes and pulp quality with a given species. In the case of the southern pines, previous work *(1, 2, 3)* at the Forest Products Laboratory[3] has shown that certain wood variables, such as springwood and summerwood content, heartwood, compression wood, density, and the conditions under which the tree grows, materially affect pulping properties and the quality of the pulps obtained.

Slash pine has for a long time been considered as a rapid-growth, high-springwood content species, but all slash pine is not of this type. For example, the Laboratory has had called to its attention a variety of slash pine (*Pinus caribaea* Morelet), growing in south central Florida, which is extremely dense and contains a high proportion of summerwood. Although this particular variety finds outlet in tank stock and other lumber specialty uses, it was decided to conduct pulping tests with it to ascertain how the high summerwood content would respond to pulping.

TABLE I.—PHYSICAL PROPERTIES OF SLASH PINE PULPWOOD, SHIPMENT 1529

| Tree [1, 2] | Log designation | Height of lower end above ground, ft. | Diameter, in. | Age, years | Rate of growth, Rings per inch | Moisture-free weight per green volume: Specific gravity | Moisture-free weight per green volume: Density, lb. per cu. ft. | Dryness of the wood, % | Proportion by volume: Heartwood, % | Proportion by volume: Summerwood, % | Bark by weight, [3] % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 1.5 | 11.7 | 103 | 17.5 | 0.690 | 43.1 | 68.4 | 54.0 | 57 | 6.4 |
| 1 | 2 | 17 | 9.6 | 102 | 21.3 | .598 | 37.4 | 63.1 | 45.7 | 45 | 8.9 |
| 2 | 3 | 1 | 14.0 | 108 | 15.5 | .777 | 48.5 | 70.8 | 43.8 | 74 | 6.1 |
| 2 | 4 | 25 | 10.1 | 104 | 20.6 | .658 | 41.1 | 64.1 | 37.5 | 46 | 8.2 |
| 3 | 5 | 16 | 11.3 | 111 | 19.6 | .656 | 40.9 | 68.8 | 47.3 | 59 | 6.2 |
| 3 | 6 | 38 | 9.5 | 103 | 21.7 | .631 | 39.4 | 64.6 | 39.5 | 52 | 7.5 |
| 4 | 7 | 1 | 11.2 | 86 | 15.4 | .779 | 48.7 | 71.4 | 46.9 | 71 | 4.6 |
| 4 | 8 | 18 | 10.0 | 87 | 19.4 | .677 | 42.3 | 66.5 | 38.9 | 53 | 6.3 |
| 5 | 9 | 18 | 13.0 | 110 | 16.9 | .746 | 46.6 | 72.9 | 50.3 | 63 | 4.4 |

[1] Tree description:

| No. | DBH (Inches) | Total height (Feet) | Crown length (Feet) |
|---|---|---|---|
| 1 | 12.0 | 60 | 10 |
| 2 | 14.8 | 66 | 15 |
| 3 | 15.0 | 65 | 20 |
| 4 | 12.0 | 71 | 24 |
| 5 | 13.6 | 78 | 36 |

[2] In all cases the tree class was dominant and the foliage density thin.

[3] Bark was lost during shipping and handling.

## Material

The test material was taken from a stand consisting entirely of slash pine of an average age of 125 years and an average diameter of 12 inches at breast height. Nine logs, each 5 feet long, were selected from five trees. Of the nine logs, three were butt logs and the remainder were from either the upper or the middle portions of the trees.

As shown in Tables I and II, this slash pine is characterized by its unusually high density, its high proportion of summerwood, and its high extractive content. Southern pines grow in many normal stands *(1, 5)* that approached these high values for density and summerwood content, but such wood usually

TABLE II.—CHEMICAL ANALYSIS OF SLASH PINE PULPWOOD, SHIPMENT 1529

| Tree | Log | Height of lower end above ground, Feet | Cellulose, % | Alpha-cellulose, % | Lignin, % | Pentosans: Total, % | Pentosans: In cellulose, % | Solubility in—: Alcohol-benzene, % | Solubility in—: Ethel, % | Solubility in—: 1 percent NaOH, % | Solubility in—: Hot water, % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 3 | 1 | 57.2 | 47.3 | 23.7 | 7.9 | 6.2 | 9.5 | 7.9 | 16.1 | 3.6 |
| 4 | 8 | 18 | 57.1 | 48.4 | 24.8 | 9.0 | 7.2 | 7.5 | 6.2 | 14.0 | 3.8 |
| 2 | 4 | 25 | 58.6 | 47.8 | 24.9 | 9.7 | 6.6 | 6.0 | 4.6 | 12.1 | 3.5 |
| Ave. sample [1] | | | 58.7 | 47.6 | 24.9 | 9.1 | 7.5 | 6.4 | 5.1 | 14.7 | 3.9 |

[1] From the nine logs comprising the shipment. See Table I.


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[3] Maintained at Madison, Wis., in cooperation with the University of Wisconsin.

exists only in the lower, or butt portions, of the trees. Usually the extractive content of trees from ordinary slash pine stands is considerably lower than that of the trees here investigated.

## Pulping Experiments

METHODS

Kraft pulps were prepared from Logs 3, 4, and 8 described in Tables I and II. Chips 5/8 inch long of each of these logs were digested in a solution containing a total of 20% of their moisture-free weight of sodium hydroxide and sodium sulphide in the ratio of two parts of the former to one part of the latter. Triplicate digestions were made in spherical steam-jacketed autoclaves of 3.7 gallons capacity. A digestion period of 3 hours was used, of which 1.5 hours were taken to increase the temperature and pressure linearly to a maximum temperature of 170 deg. C. The total concentration of chemicals in the cooking liquor, expressed as NaOH and sodium sulphide, including the moisture in the chips, was 50 grams per liter.

In addition, bleachable pulps were prepared from Log 3, a mixture of Logs 1 and 7, and a mixture of Logs 2, 5, 6, and 9 for use in high-grade papers. For these three digestions, a total concentration of 62.85 grams per liter and a total of 27.5% chemical was used. With the exception of Digestion 2513 (Table III), these digestions, conducted in a 14-cubic foot tumbling steam-jacketed digester, were given 3.5 hours cooking of which a 2-hour linear temperature-pressure increase period was allowed to attain a maximum temperature of 170 deg. C. The schedule for Digestion 2513 (Table III) was as follows: 1.75 hours to 180 deg. C., 0.25 hour at 180 deg. C., and a 7-minute blowdown period.

Yield, strength properties, bleach consumption, and chemical characteristics of all pulps were determined as previously described *(1, 2)*.

## Results and Discussion

The results of the pulping experiments are shown in Table III.

TABLE III.—SULPHATE PULPING OF HIGH-DENSITY SLASH PINE (PINUS

| Digestion designation | Wood: Moisture, % | Wood: Weight: Moist, lb. | Wood: Weight: Moisture-free, lb. | Cooking and yield data: Chemicals: Charged: Concentration: NaOH, g./l. | NaaS, g./l. | Total, g./l. | Total effective alkali as NaOH, g./l. | Per 100 pounds misture-free wood: NaOH, lb. | NaaS, lb. | Total, lb. | Total effective alkali as NaOH, lb. | Volume, gal. | Consumed: Ratio of combined to total alkali, % | On moisture-free wood, % | Total effective alkali as NaOH, % | Black liquor: Density at 15 deg. C., deg. Be. | Total solids, % | Heat value per pound moisture-free residue, B.t.u. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1184 | | | | | | | | | | | | | 83.3 | 16.7 | 14.0 | 11.1 | | |
| 1185 | 35.5 | 6.20 | 4.0 | 33.33 | 16.67 | 50.00 | 41.88 | 13.33 | 6.67 | 20.00 | 16.75 | 48.0 | 83.8 | 16.8 | 14.0 | 11.0 | 16.1 | 7116 |
| 1186 | (Upper—Log 4—Tree 2—46% summerwood) | | | | | | | | | | | | 84.2 | 16.8 | 14.1 | 11.3 | | |
| (Average | | | | | | | | | | | | | 83.8 | 16.8 | 14.0 | 11.1 | | |
| 1181 | | | | | | | | | | | | | 81.4 | 16.3 | 13.6 | 10.6 | | |
| 1182 | 24.1 | 5.27 | 4.0 | 33.33 | 16.67 | 50.00 | 41.88 | 13.33 | 6.67 | 20.00 | 16.75 | 48.0 | 81.4 | 16.3 | 13.6 | 10.6 | 15.6 | 7035 |
| 1183 | (Butt—Log 3—Tree 2—74% summerwood) | | | | | | | | | | | | 81.9 | 16.4 | 13.7 | 10.6 | | |
| (Average | | | | | | | | | | | | | 81.6 | 16.3 | 13.6 | 10.6 | | |
| 1187 | | | | | | | | | | | | | 80.9 | 16.2 | 13.6 | 11.4 | | |
| 1188 | 29.6 | 5.68 | 4.0 | 33.33 | 16.67 | 50.00 | 41.88 | 13.33 | 6.67 | 20.00 | 16.75 | 48.0 | 81.4 | 16.3 | 13.6 | 11.3 | 16.2 | 7273 |
| 1189 | (Upper—Log 8—Tree 4—53% summerwood) | | | | | | | | | | | | 81.4 | 16.3 | 13.6 | 11.0 | | |
| (Average | | | | | | | | | | | | | 81.2 | 16.3 | 13.6 | 11.2 | | |
| 2507 | 23.5 | 117.7 | 90.0 | 41.90 | 20.95 | 62.85 | 52.65 | 18.33 | 9.17 | 27.50 | 23.03 | 52.5 | 65.4 | 18.0 | 15.1 | 12.0 | 16.9 | 6444 |
| | (Butt—Log 3—Tree 2—74% summerwood) | | | | | | | | | | | | | | | | | |
| 2508 | 23.5 | 117.7 | 90.0 | 41.90 | 20.95 | 62.85 | 52.65 | 18.33 | 9.17 | 27.50 | 23.03 | 52.5 | 66.6 | 18.3 | 15.3 | 12.1 | 17.0 | 6342 |
| | (Butt—Log 3—Tree 2—74% summerwood) | | | | | | | | | | | | | | | | | |
| 2509 | 24.8 | 159.7 | 120.0 | 41.90 | 20.95 | 62.85 | 52.65 | 18.33 | 9.17 | 27.50 | 23.03 | 52.5 | 64.3 | 17.7 | 14.8 | 12.1 | ... | .... |
| | (Butt—Log 1 and 7—64% summerwood) | | | | | | | | | | | | | | | | | |
| 2510 | 25.0 | 133.3 | 100.0 | 41.90 | 20.95 | 62.85 | 52.65 | 18.33 | 9.17 | 27.50 | 23.03 | 52.5 | 63.9 | 17.6 | 14.7 | 12.2 | ... | .... |
| | (Butt—Log 1 and 7—64% summerwood) | | | | | | | | | | | | | | | | | |
| 2511 | 24.5 | 165.7 | 125.0 | 41.90 | 20.95 | 62.85 | 52.65 | 18.33 | 9.17 | 27.50 | 23.03 | 52.5 | 65.8 | 18.1 | 15.1 | 11.9 | ... | .... |
| | (Log 2, 5, 6, and 9—56.7% summerwood) | | | | | | | | | | | | | | | | | |
| 2512 | 23.8 | 140.5 | 107.0 | 41.90 | 20.95 | 62.85 | 52.65 | 18.33 | 9.17 | 27.50 | 23.03 | 52.5 | 64.7 | 17.8 | 14.9 | 11.9 | ... | .... |
| | (Log 2, 5, 6, and 9—56.7% summerwood) | | | | | | | | | | | | | | | | | |
| 2513 | 19.0 | 101.8 | 82.5 | 41.90 | 20.95 | 62.85 | 52.65 | 18.33 | 9.17 | 27.50 | 23.03 | 52.5 | 62.8 | 17.3 | 14.5 | 11.8 | ... | .... |
| | (Log 2, 5, 6, and 9—56.7% summerwood) | | | | | | | | | | | | | | | | | |

[1] An additional 7 minutes was required to reduce pressure to 90 pounds before blowing.

Unlike the relationships previously found for the usual run of southern yellow pines *(1)*, the strength properties of the kraft pulps obtained from representative samples of this slash pine could not be correlated with either the summerwood-springwood ratio, wood density, or position of bolt in the tree. It should be mentioned, however, that in certain cases there is a lack of such correlation in kraft pulps prepared from coniferous species other than the pines *(7)* and even from certain growth types of the southern yellow pines *(6)*.

In general, the kraft pulps from the high-density slash pine had rather low bursting, folding, and tensile strengths, and low solid fractions. Their coarse fibers possessed a high resistance to tear and required only relatively short beating periods to develop their strength properties. The yields of pulp per hundred pounds of moisture-free wood were low in comparison with similar digestions on other samples of southern pine *(1, 6)*, but if allowance is made for the high extractive content of this wood, such results are not uncommon. However, owing to the high density of the wood, pulp yields on a unit volume basis would be high in comparison with the usual run of southern yellow pine.

Some of the bleachable pulps (Digestion 2507-2508, Table III) from Log 3 were superior in many respects to the rawer cooked kraft pulp from the same material. The bleachable pulps were of a higher purity, had higher bursting, tensile and tearing strengths, higher solid fractions, and required longer beating periods for strength development than did the kraft pulps.

In general, all the bleachable pulps were of higher purity than that of the kraft pulps and compared favorably with them in regard to strength characteristics. The values for solid fraction of the bleachable pulps were definitely higher than those of the less severely cooked pulps.

Digestion 2513 (Table III), the cooking schedule of which deviated from that used in the production of the other bleachable pulps, produced a raw pulp of low yield and somewhat similar to the kraft pulps. The change was made in the cooking schedule because of previous pulping tests on red gum *(8)* and because European tests on aspen and birch from Finland *(9)*

CARIBAEA MORELET) FOR THE PRODUCTION OF KRAFT AND BLEACHABLE PULP

| | Temperature-increase period, hr. | Duration at maximum temperature, hr. | Maximum temperature, deg. C. | Yield moisture-free pulp: Screened, % | Screenings, % | Total, % | Interpolated test beater strength data on unbleached pulp (Tests made at 72deg. F. and 65% relative humidity): Freeness (Schopper), cc. | Time of treatment, min. | Bursting strength, pt./lb./ream | Tearing strength, g./lb./ream | Double folds, no. | Tensile strength, lb./sq. in. | Solid fraction, ratio | Bleach requirement: Standard bleach added, % | Readings: Red, parts | Green, parts | Blue, parts | Chemical analysis: Cellulose: Total, % | Alpha, % | Lignin, % | Total pentosans, % | Chlorine number (Roe), % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1184 | 1½ | 1½ | 170 | 45.2 | 0.4 | 45.6 | 885 | 0 | 0.13 | 1.5 | 0 | 32 | 0.21 | Original wood.... | | | | 58.6 | 47.8 | 24.9 | 9.7 | |
| 1185 | | | | 46.1 | .3 | 46.4 | 700 | 40 | .85 | 2.8 | 800 | 4600 | .38 | 0 | 42 | 28 | 22 | 91.2 | 78.9 | 4.6 | 7.8 | 5.5 |
| 1186 | | | | 45.8 | .4 | 46.2 | 550 | 47 | .96 | 2.5 | 1030 | 5500 | .41 | 25 | 72 | 57 | 42 | | | | | |
| | | | | | | | | | | | | | | 35 | 82 | 70 | 58 | | | | | |
| | | | | 45.7 | .4 | 46.1) | | | | | | | | 45 | 85 | 80 | 71 | | | | | |
| 1181 | 1½ | 1½ | 170 | 43.7 | 1.1 | 44.8 | 890 | 0 | .10 | .7 | .... | 94 | .20 | Original wood.... | | | | 57.2 | 47.3 | 23.7 | 7.9 | |
| 1182 | | | | 42.9 | 1.1 | 44.0 | 700 | 43 | .85 | 3.0 | .... | 4300 | .39 | 0 | 39 | 27 | 20 | 91.5 | 80.8 | 4.7 | 7.7 | 4.9 |
| 1183 | | | | 42.9 | 1.0 | 43.9 | 550 | 50 | .96 | 2.4 | .... | 5300 | .41 | 25 | 78 | 61 | 46 | | | | | |
| | | | | | | | | | | | | | | 35 | 85 | 74 | 61 | | | | | |
| | | | | 43.2 | 1.1 | 44.3) | | | | | | | | 45 | 88 | 83 | 75 | | | | | |
| 1187 | 1½ | 1½ | 170 | 43.5 | .2 | 43.7 | 885 | 0 | .12 | 1.1 | 0 | 343 | .22 | Original wood.... | | | | 57.1 | 48.4 | 24.8 | 9.0 | |
| 1188 | | | | 43.1 | .2 | 43.3 | 700 | 40 | .78 | 2.8 | 620 | 4200 | .37 | 0 | 40 | 29 | 23 | 90.7 | 77.1 | 5.7 | 6.2 | 6.3 |
| 1189 | | | | 43.0 | .2 | 43.2 | 550 | 51 | .87 | 2.4 | 940 | 500 | .39 | 25 | 78 | 64 | 48 | | | | | |
| | | | | | | | | | | | | | | 35 | 85 | 75 | 65 | | | | | |
| | | | | 43.2 | .2 | 43.4) | | | | | | | | 45 | 88 | 82 | 75 | | | | | |
| 2507 | 2 | 1½ | 170 | 42.2 | .1 | 42.3 | 885 | 0 | .12 | 1.2 | 0 | 447 | .22 | 0 | 42 | 31 | 25 | 96.6 | 81.3 | 2.8 | 6.3 | 3.3 |
| | | | | | | | 700 | 49 | .98 | 3.0 | 1160 | 5200 | .41 | 20 | 79 | 71 | 60 | | | | | |
| | | | | | | | 550 | 62 | 1.06 | 2.5 | 1390 | 6300 | .44 | 25 | 82 | 75 | 65 | | | | | |
| | | | | | | | | | | | | | | 30 | 83 | 80 | 73 | | | | | |
| 2508 | 2 | 1½ | 170 | 42.5 | .1 | 42.6 | 890 | 0 | .13 | 1.3 | 1 | 435 | .23 | 0 | 45 | 33 | 28 | 94.8 | 80.6 | 1.5 | 6.2 | 3.1 |
| | | | | | | | 700 | 49 | .95 | 3.1 | 1590 | 5000 | .41 | 20 | 78 | 67 | 55 | | | | | |
| | | | | | | | 550 | 63 | 1.04 | 2.6 | 1760 | 6000 | .44 | 25 | 86 | 78 | 71 | | | | | |
| | | | | | | | | | | | | | | 30 | 87 | 80 | 76 | | | | | |
| 2509 | 2 | 1½ | 170 | 41.1 | .1 | 41.2 | 900 | 0 | .14 | 1.5 | 6 | 541 | .23 | 0 | 45 | 34 | 29 | 96.3 | 81.8 | 1.5 | 6.6 | 3.5 |
| | | | | | | | 700 | 46 | .86 | 2.4 | 830 | 5000 | .41 | 20 | 83 | 75 | 68 | | | | | |
| | | | | | | | 550 | 57 | .91 | 2.0 | 1000 | 6200 | .44 | 25 | 89 | 83 | 76 | | | | | |
| | | | | | | | | | | | | | | 30 | 89 | 85 | 80 | | | | | |
| 2510 | 2 | 1½ | 170 | 41.6 | .1 | 41.7 | 890 | 0 | .17 | 1.8 | 1 | 571 | .23 | 0 | 45 | 34 | 30 | 96.4 | 83.4 | .7 | 6.6 | 3.3 |
| | | | | | | | 700 | 43 | .76 | 2.6 | 780 | 3900 | .40 | 20 | 85 | 77 | 67 | | | | | |
| | | | | | | | 550 | 54 | .83 | 2.1 | 760 | 5100 | .44 | 25 | 89 | 84 | 77 | | | | | |
| | | | | | | | | | | | | | | 30 | 90 | 85 | 80 | | | | | |
| 2511 | 2 | 1½ | 170 | 41.5 | .1 | 41.6 | 880 | 0 | .18 | 2.0 | 2 | 746 | .23 | 0 | 42 | 31 | 26 | 97.6 | 88.5 | 2.6 | 6.3 | 3.1 |
| | | | | | | | 700 | 48 | .99 | 2.5 | 1100 | 5200 | .41 | 20 | 81 | 73 | 64 | | | | | |
| | | | | | | | 550 | 63 | 1.05 | 2.1 | 1300 | 6500 | .43 | 25 | 86 | 79 | 71 | | | | | |
| | | | | | | | | | | | | | | 30 | 89 | 85 | 78 | | | | | |
| 2512 | 2 | 1½ | 170 | 39.9 | .1 | 40.0 | 890 | 0 | .20 | 2.0 | 0 | 222 | .24 | 0 | .. | .. | .. | 95.5 | 82.3 | 2.6 | 6.4 | 3.0 |
| | | | | | | | 700 | 44 | .98 | 2.6 | 960 | 5700 | .43 | 20 | 85 | 78 | 69 | | | | | |
| | | | | | | | 550 | 55 | 1.07 | 2.2 | 960 | 6900 | .46 | 25 | 86 | 80 | 72 | | | | | |
| | | | | | | | | | | | | | | 30 | 88 | 85 | 79 | | | | | |
| 2513 | 1¾ | 1¾ | 180 | 40.7 | .3 | 41.0 | 885 | 0 | .12 | 1.5 | 0 | 152 | .21 | 0 | .. | .. | .. | 94.2 | 80.4 | 3.5 | 6.1 | 4.3 |
| | | | | | | | 700 | 46 | .87 | 2.5 | 770 | 4800 | .41 | 20 | .. | .. | .. | | | | | |
| | | | | | | | 550 | 60 | .95 | 2.1 | 790 | 5800 | .43 | 25 | .. | .. | .. | | | | | |
| | | | | | | | | | | | | | | 30 | 84 | 81 | 70 | | | | | |

TABLE IV.—RESULTS OBTAINED IN BLEACHING HIGH DENSITY SLASH PINE (PINUS CARIBAEA MORLET) SULPHATE PULP

| Details of bleaching conditions | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Chemical applied | | | | | Chlorine partition | | | | | | | Ives color readings | | | | | Pulp properties | | | | | | | | | | | | | |
| Bleach | Source of pulp | Stage | Name, formula | On weight of moisture-free pulp, % | Temperature, deg. C. | Reaction time, hours | Amount of chlorine consumed, % | On amount of total chlorine charged, % | On amount of total chlorine consumed, % | Total chlorine applied, % | Total chlorine consumed, % | Total reaction time, hours | Red, parts | Green, parts | Blue, parts | Alpha cellulose, % | Ash, % | Beating time, minutes | Ream weight, pounds (25x40—500) | Freeness S.R., cc. | Bursting strength, pts/lb. /ream | Tearing strength, g./lb./ream | Double folds, no. | Tensile strength, lb./sq. in. | Solid fraction, ratio |
| 505 | Digestion 2507 | 1 | $Cl_2 + NaOH$ | 7.1 | 16 | 3.75 | 7.02 | 96.0 | 95.9 | | | | | | | | | | | | | | | | |
| | | 2 | NaOH | 2.0 | 33–70 | 2.50 | ... | ... | ... | | | | | | | | | | | | | | | | |
| | | 3 | $Ca(OCl)_2$ | .3 | 40 | 1.83 | .30 | 4.1 | 4.1 | | | | | | | | | | | | | | | | |
| | | 4 | NaOH | 1.0 | 50–68 | 1.50 | ... | ... | ... | | | | | | | | | | | | | | | | |
| | | 5 | [1] $SO_2$ | .. | 18 | .38 | ... | ... | ... | | | | | | | | | | | | | | | | |
| | | 6 | [1] $Cl_2$ | 3.4 | .. | .08 | ... | ... | ... | 7.40 | 7.32 | 10.0 | 87 | 85 | 82 | ... | .. | 0 | 58.9 | 890 | 0.17 | 1.8 | 2 | 842 | 0.26 |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | 20 | 52.4 | 860 | .64 | 2.3 | 102 | 3,024 | .38 |
| | | | | | | | | | | | | | | | | | | 30 | 53.9 | 790 | .74 | 2.3 | 622 | 3,926 | .42 |
| 506 | Digestion 2508 | 1 | $Cl_2 + NaOH$ | 7.2 | 16 | 5.00 | 6.78 | 93.5 | 95.7 | | | | | | | | | | | | | | | | |
| | | 2 | NaOH | 2.0 | 50–70 | 1.25 | ... | ... | ... | | | | | | | | | | | | | | | | |
| | | 3 | $Ca(OCl)_2$ | .3 | 20 | 4.25 | .23 | 3.9 | 3.3 | | | | | | | | | | | | | | | | |
| | | 4 | $Ca(OCl)_2$ | .2 | 18 | 9.25 | .07 | 2.6 | 1.0 | 7.70 | 7.08 | 19.8 | 89 | 85 | 80 | ... | .. | | | | | | | | |
| 507 | Bleach 505 and 506 | 1 | $Ca(OCl)_2$ | .13 | 40 | 4.00 | .13 | .... | .... | | | | | | | | | | | | | | | | |
| | | 2 | [1] $SO_2$ | ... | 18 | .50 | .... | .... | .... | 7.62 | 7.26 | ... | 92 | 91 | 88 | 92.4 | 0.4 | 0 | 56.5 | 895 | .23 | 2.4 | 3 | 986 | .27 |
| | | | | | | | | | | | | | | | | | | 20 | 53.9 | 850 | .66 | 2.3 | 206 | 2,968 | .39 |
| | | | | | | | | | | | | | | | | | | 30 | 58.1 | 760 | .74 | 1.9 | 312 | 3,845 | .41 |
| 508 | Digestion 2509 | 1 | $Cl_2 — NaOH$ | 6.3 | 15 | 2.22 | 6.30 | 90.0 | 92.0 | | | | | | | | | | | | | | | | |
| | | 2 | NaOH | 2.0 | 47–70 | 1.50 | ... | ... | ... | | | | | | | | | | | | | | | | |
| | | 3 | $Ca(OCl)_2$ | .5 | 40 | 3.67 | .50 | 7.1 | 7.3 | ... | ... | ... | 92 | 89 | 83 | ... | .. | | | | | | | | |
| | | 4 | $Ca(OCl)_2$ | .2 | 40 | 2.00 | .05 | 2.9 | .7 | | | | | | | | | | | | | | | | |
| | | 5 | [1] $SO_2$ | ... | 15 | .13 | ... | ... | ... | 7.00 | 6.85 | 9.5 | 95 | 93 | 89 | 90.4 | .5 | 0 | 61.1 | 900 | .15 | 1.9 | 2 | 628 | .27 |
| | | | | | | | | | | | | | | | | | | 20 | 63.3 | 855 | .54 | 1.4 | 70 | 3,160 | .40 |
| | | | | | | | | | | | | | | | | | | 30 | 58.7 | 755 | .58 | 1.2 | 95 | 3,500 | .44 |
| 509 | Digestion 2509 and 2510 | 1 | $Cl_2 — NaOH$ | 6.3 | 26 | .67 | 6.30 | 86.4 | 88.7 | | | | | | | | | | | | | | | | |
| | | 2 | NaOH | 2.0 | 48–70 | 1.25 | ... | ... | ... | | | | | | | | | | | | | | | | |
| | | 3 | $Ca(OCl)_2$ | .5 | 40 | 3.50 | .50 | 6.9 | 7.0 | ... | ... | ... | 87 | 82 | 75 | ... | .. | | | | | | | | |
| | | 4 | $Ca(OCl)_2$ | .5 | 40 | 3.00 | .30 | 6.9 | 4.2 | | | | | | | | | | | | | | | | |
| | | 5 | [1] $SO_2$ | ... | 15 | .17 | ... | ... | ... | 7.30 | 7.10 | 8.6 | 90 | 88 | 84 | 91.6 | .4 | 0 | 64.3 | 900 | .18 | 1.9 | 1 | 768 | .26 |
| | | | | | | | | | | | | | | | | | | 20 | 62.2 | 865 | .56 | 1.8 | 85 | 2,830 | .38 |
| | | | | | | | | | | | | | | | | | | 30 | 58.0 | 830 | .67 | 1.6 | 256 | 4,010 | .41 |
| 510 | Digestion 2510 | 1 | $Cl_2 — NaOH$ | 6.3 | 15 | 5.00 | 6.13 | 90.0 | 92.9 | | | | | | | | | | | | | | | | |
| | | 2 | NaOH | 2.0 | 51–71 | 1.33 | ... | ... | ... | | | | | | | | | | | | | | | | |
| | | 3 | $Ca(OCl)_2$ | .5 | 40 | 4.00 | .41 | 7.1 | 6.2 | ... | ... | ... | 91 | 87 | 80 | ... | .. | | | | | | | | |
| | | 4 | $Ca(OCl)_2$ | .2 | 40 | 2.00 | .06 | 2.9 | .9 | | | | | | | | | | | | | | | | |
| | | 5 | [1] $SO_2$ | ... | .. | ... | ... | ... | ... | 7.00 | 6.60 | 12.5 | 93 | 91 | 86 | 92.0 | .3 | 0 | 68.0 | 890 | .16 | 1.7 | 1 | 616 | .26 |
| | | | | | | | | | | | | | | | | | | 20 | 58.3 | 865 | .58 | 2.1 | 78 | 2,840 | .38 |
| | | | | | | | | | | | | | | | | | | 30 | 56.1 | 840 | .64 | 1.8 | 193 | 3,510 | .42 |
| 511 | Digestion 2511 | 1 | $Cl_2$ | 8.0 | 22 | .33 | 7.80 | ... | ... | | | | | | | | | | | | | | | | |
| | | 1a | NaOH | 6.6 | 22 | .67 | ... | ... | ... | | | | | | | | | | | | | | | | |
| | | 2 | $Ca(OCl)_2$ | .3 | 18 | 3.25 | .30 | ... | ... | ... | ... | ... | 87 | 81 | 73 | ... | .. | | | | | | | | |
| | | 3 | $Ca(OCl)_2$ | .15 | 37 | 1.33 | .15 | ... | ... | ... | ... | ... | 88 | 82 | 74 | ... | .. | | | | | | | | |
| | | 4 | [1] $SO_2$ | ... | 16 | .25 | ... | ... | ... | 8.45 | 8.25 | 5.8 | 89 | 84 | 76 | 89.2 | .. | 0 | 53.1 | 905 | .25 | 2.7 | 3 | 1,235 | .26 |
| | | | | | | | | | | | | | | | | | | 20 | 54.2 | 860 | .83 | 2.7 | 595 | 5,040 | .38 |
| | | | | | | | | | | | | | | | | | | 30 | 53.9 | 810 | .98 | 2.3 | 1026 | 5,230 | .41 |
| 512 | Digestion 2511 | 1 | $Cl_2$ | 7.0 | 22 | .33 | 6.95 | 94.0 | 93.9 | | | | | | | | | | | | | | | | |
| | | 1a | NaOH | 6.7 | 22 | .67 | ... | ... | ... | | | | | | | | | | | | | | | | |
| | | 2 | NaOH | 1.0 | 50–68 | 1.50 | ... | ... | ... | | | | | | | | | | | | | | | | |
| | | 3 | $Ca(OCl)_2$ | .3 | 40 | .67 | .30 | 4.0 | 4.1 | ... | ... | ... | 88 | 83 | 75 | ... | .. | | | | | | | | |
| | | 4 | $Ca(OCl)_2$ | .15 | 36 | 2.50 | .15 | 2.0 | 2.0 | ... | ... | ... | 91 | 87 | 82 | ... | .. | | | | | | | | |
| | | 5 | [1] $SO_2$ | ... | 16 | .25 | ... | ... | ... | 7.45 | 7.40 | 5.9 | 90 | 89 | 82 | 89.0 | .. | 0 | 57.3 | 895 | .25 | 2.6 | 3 | 1,080 | .29 |
| | | | | | | | | | | | | | | | | | | 20 | 60.5 | 850 | .73 | 2.1 | 574 | 4,260 | .41 |
| | | | | | | | | | | | | | | | | | | 30 | 61.3 | 785 | .83 | 2.0 | 571 | 4,950 | .44 |
| 513 | Digestion 2511 | 1 | $Cl_2$ | 7.0 | 22 | .33 | 7.00 | 94.0 | 94.0 | | | | | | | | | | | | | | | | |
| | | 1a | NaOH | 6.8 | 22 | .47 | ... | ... | ... | | | | | | | | | | | | | | | | |
| | | 2 | NaOH | 2.0 | 50–69 | 1.17 | ... | ... | ... | | | | | | | | | | | | | | | | |
| | | 3 | $Ca(OCl)_2$ | .3 | 39 | .92 | .30 | 4.0 | 4.0 | ... | ... | ... | 88 | 83 | 75 | ... | .. | | | | | | | | |
| | | 4 | $Ca(OCl)_2$ | .15 | 37 | 3.25 | .15 | 2.0 | 2.0 | ... | ... | ... | 91 | 87 | 81 | ... | .. | | | | | | | | |
| | | 5 | [1] $SO_2$ | ... | 15 | .25 | ... | ... | ... | 7.45 | 7.45 | 6.4 | 90 | 89 | 82 | 93.8 | .. | 0 | 68.2 | 890 | .25 | 2.6 | 3 | 1,150 | .27 |
| | | | | | | | | | | | | | | | | | | 20 | 62.2 | 850 | .75 | 3.3 | 363 | 3,470 | .39 |
| | | | | | | | | | | | | | | | | | | 30 | 74.2 | 825 | .90 | 2.8 | 1053 | 5,240 | .41 |
| 515 | Digestion 2511 | 1 | $Cl_2$ | 6.3 | 16 | .33 | 6.09 | 92.7 | 93.0 | | | | | | | | | | | | | | | | |
| | | 1a | NaOH | 7.0 | 16 | 1.67 | ... | ... | ... | | | | | | | | | | | | | | | | |
| | | 2 | NaOH | 1.0 | 49 | 1.00 | ... | ... | ... | | | | | | | | | | | | | | | | |
| | | 3 | $Ca(OCl)_2$ | .3 | 32 | 3.00 | .30 | 4.4 | 4.6 | ... | ... | ... | 90 | 84 | 77 | ... | .. | | | | | | | | |
| | | 4 | $Ca(OCl)_2$ | .2 | 37 | 6.00 | .16 | 2.9 | 2.4 | ... | ... | ... | 89 | 86 | 79 | ... | .. | | | | | | | | |
| | | 5 | [1] $SO_2$ | ... | 15 | .75 | ... | ... | ... | 6.80 | 6.55 | 12.8 | 90 | 86 | 81 | 93.9 | .. | 0 | 61.9 | 895 | .26 | 2.8 | 3 | 1.050 | .27 |
| | | | | | | | | | | | | | | | | | | 20 | 57.2 | 870 | .82 | 3.3 | 638 | 4,330 | .40 |
| | | | | | | | | | | | | | | | | | | 30 | 59.4 | 835 | .93 | 2.9 | 1127 | 4,480 | .43 |
| 516 | Digestion 2512 | 1 | $Cl_2$ | 6.3 | 17 | .33 | 6.19 | 91.9 | 92.2 | | | | | | | | | | | | | | | | |
| | | 1a | NaOH | 6.3 | 17 | 1.17 | ... | ... | ... | | | | | | | | | | | | | | | | |
| | | 2 | NaOH | 1.0 | 50 | 1.00 | ... | ... | ... | | | | | | | | | | | | | | | | |
| | | 3 | $Ca(OCl)_2$ | .4 | 30 | 5.33 | .37 | 5.8 | 5.5 | ... | ... | ... | 89 | 86 | 79 | ... | .. | | | | | | | | |
| | | 4 | $Ca(OCl)_2$ | .075 | 40 | .75 | .075 | 1.1 | 1.1 | ... | ... | ... | 89 | 85 | 79 | ... | .. | | | | | | | | |
| | | 5 | [1] $SO_2$ | ... | 15 | .67 | ... | ... | ... | ... | ... | ... | 89 | 87 | 81 | ... | .. | | | | | | | | |
| | | 6 | $Ca(OCl)_2$ | .075 | 40 | 1.00 | .075 | 1.1 | 1.1 | ... | ... | ... | 90 | 87 | 82 | ... | .. | | | | | | | | |
| | | 7 | [1] $SO_2$ | ... | 15 | .75 | ... | ... | ... | 6.85 | 6.71 | 11.0 | 90 | 88 | 82 | 92.7 | .. | 0 | 61.4 | 895 | .27 | 2.7 | 3 | 1.147 | .27 |
| | | | | | | | | | | | | | | | | | | 20 | 69.0 | 870 | .75 | 3.4 | 443 | 3,660 | .39 |
| | | | | | | | | | | | | | | | | | | 30 | 54.0 | 840 | .82 | 3.0 | 1170 | 4,140 | .42 |

had indicated that a short, rapid digestion produced higher yields of stronger, easier bleaching pulps. In this case, however, the results were opposite to those obtained with these hardwoods, which vary from thin to moderately thick in wall thickness *(10)*. (*See* Digestion 2511, 2512, 2513, Table III.)

## Bleaching Experiments

### Methods

The bleachable pulps were bleached by a method essentially that described by Rue *(11)*, differing only in that NaOH was used instead of lime. The bleaching apparatus consisted of a covered wooden tank fitted with a draught tube and a painted metal stirrer. The tank had a capacity of 35 pounds of moisture-free pulp when suspended in water at a consistence of 2%.

The first stage of bleaching consisted of a chlorination treatment at a pH of approximately 2 and at a temperature ranging between 15 and 20 deg. C. Upon the termination of an approximately 20-minute chlorine treatment, sufficient sodium hydroxide was added to bring the pH quickly from approximately 2 to 8, so as to avoid the intermediate range, which is detrimental to the strength properties of the pulp. As the pH decreased during bleaching, sufficient NaOH was added to maintain this hydrogen ion concentration. When the chlorine, then in the form of hypochlorite, was approximately exhausted the pulp was pumped into a large box equipped with a fine-mesh copper screen, where it was drained and washed.

The pulp was then returned to the chlorinator and extracted for approximately 1 hour at a temperature ranging between 50 and 70 deg. C. with a 1 to 2% solution of NaOH and finally washed with hot water. Except in two instances (Bleaches 517 and 519, Table IV), when potassium permanganate was used in the final bleaching stages, this treatment was followed by two or more calcium hypochlorite bleaching treatments at approximately 40 deg. C. Washing of the pulps with cold water was done between the hypochlorite bleaching stages. A final soaking and washing with sulphur dioxide water at a pH of approximately 6 was employed to inhibit reversion in color.

Where potassium permanganate was employed instead of calcium hypochlorite in the final bleaching treatment, the hydrogen ion concentration of the stock in the chlorinator was lowered to a pH of approximately 2 by the addition of a small amount of sulphuric acid before adding the permanganate. The reaction was then allowed to continue to approximate exhaustion of the bleaching agent. An excess of sulphur dioxide was then conducted into the stock to destroy any excess of permanganate and to remove any manganese dioxide adhering to the fibers. The pulp was finally dumped into a screened box and thoroughly washed with cold water. The results of the bleaching experiments are recorded in Table IV.

### Discussion of Results of Bleaching

The first bleaching experiment (Bleach 507, Table IV) on Digestions 2507 and 2508 produced a high alpha-cellulose pulp of a whiteness of 88 parts, but of low strength characteristics. Bleaches 508, 509, and 510 on Digestions 2509 and 2510 yielded pulps of a whiteness of 89, 84, and 86 parts, respectively. The alpha-cellulose content of these pulps was comparatively high but none of them possessed satisfactory strength properties. (*See* Table IV.)

TABLE IV.—RESULTS OBTAINED IN BLEACHING HIGH DENSITY SLASH PINE (PINUS CARIBAEA MORELET) SULPHATE PULP—(Continued)

| Bleach | Source of pulp | Details of bleaching conditions: Stage | Chemical applied: Name, formula | Chemical applied: On weight of moisture-free pulp, % | Temperature, deg. C. | Reaction time, hours | Amount of chlorine consumed, % | Chlorine partition: On amount of total chlorine charged, % | Chlorine partition: On amount of total chlorine consumed, % | Total chlorine applied, % | Total chlorine consumed, % | Total reaction time, hours | Pulp properties: Ives color readings: Red, parts | Ives color readings: Green, parts | Ives color readings: Blue, parts | Alpha cellulose, % | Ash, % | Beating time, minutes | Ream weight, pounds (25x40—500) | Freeness S.R., cc. | Bursting strength, pts./lb./ream | Tearing strength, g./lb./ream | Double folds, no. | Tensile strength, lb./sq. in. | Solid fraction, ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 517 | Digestion 2513 | 1 | $Cl_2$ | 7.0 | 15 | .33 | 7.00 | ... | ... | ... | ... | ... | 90 | 85 | 79 | 93.5 | .4 | 0 | 63.0 | 905 | .20 | 2.3 | 2 | 685 | .25 |
| | | 1a | NaOH | 7.7 | 15 | .33 | ... | ... | ... | ... | ... | ... | 87 | 87 | 84 | | | 20 | 58.4 | 875 | .68 | 3.6 | 185 | 3,000 | .35 |
| | | 2 | NaOH | 1.0 | 50 | 1.00 | .50 | ... | ... | ... | ... | ... | | | | | | 30 | 63.9 | 860 | .82 | 3.1 | 535 | 3,790 | .38 |
| | | 3 | $Ca(OCl)_2$ | .5 | 40 | .58 | ... | ... | ... | ... | ... | ... | | | | | | | | | | | | | |
| | | 4 | NaOH | .5 | 50 | 1.00 | ... | ... | ... | ... | ... | ... | | | | | | | | | | | | | |
| | | 5 | $KMnO_4$ | 1.0 | 19 | 1.00 | ... | ... | ... | ... | ... | ... | | | | | | 0 | 65.5 | 900 | .23 | 2.6 | 3 | 1,125 | .28 |
| | | 6 | $KMnO_4$ | .5 | 22 | 1.00 | ... | ... | ... | ... | ... | ... | | | | | | 20 | 65.4 | 865 | .75 | 3.2 | 498 | 3,240 | .39 |
| | | | | | | | | | | | | | | | | | | 30 | 58.9 | 840 | .79 | 2.9 | 1053 | 4,750 | .42 |
| 518 | Bleach 515 | 1 | NaOH | .5 | 50 | 1.00 | ... | ... | ... | ... | ... | ... | 88 | 86 | 82 | ... | ... | | | | | | | | |
| | | 2 | $Ca(OCl)_2$ | .1 | 40 | 3.17 | ... | ... | ... | ... | ... | ... | 89 | 88 | 83 | ... | ... | | | | | | | | |
| | | 3 | $^1SO_2$ | ... | ... | ... | ... | ... | ... | ... | ... | ... | | | | | | | | | | | | | |
| | | 4 | $Ca(OCl)_2$ | .1 | 40 | 2.25 | ... | ... | ... | ... | ... | ... | | | | | | 0 | 65.5 | 900 | .23 | 2.6 | 3 | 1,125 | .28 |
| | | 5 | $^2SO_2$ | ... | ... | ... | ... | ... | ... | 7.00 | 6.75 | ... | 89 | 87 | 83 | 93.6 | .5 | 20 | 65.4 | 865 | .75 | 3.2 | 498 | 3,240 | .39 |
| | | | | | | | | | | | | | | | | | | 30 | 58.9 | 840 | .79 | 2.9 | 1053 | 4,750 | .42 |
| 519 | Bleach 516 | 1 | $KMnO_4$ | .16 | 15 | .58 | ... | ... | ... | ... | ... | ... | 88 | 85 | 81 | 93.0 | .3 | 0 | 58.3 | 905 | .25 | 2.4 | 6 | 1,050 | .27 |
| | | 2 | $KMnO_4$ | .20 | 15 | .83 | ... | ... | ... | ... | ... | 1.4 | 91 | 90 | 86 | | | 20 | 56.4 | 870 | .64 | 3.2 | 324 | 3,660 | .38 |
| | | | | | | | | | | | | | | | | | | 30 | 58.1 | 855 | .78 | 3.0 | 711 | 4,150 | .39 |

[1] $SO_2$ added to bring pulp to pH of 4. [2] $Cl_2$ added to destroy the $SO_2$—final pH—5. [3] $SO_2$ added to bring pulp to a pH of approximately 6.

In addition, some small-scale bleaching tests were made (no. 511, 512, and 513) in which batches of 800 grams of moisture-free pulp from another digestion (2511) were treated in a 10-gallon bakelite-painted, copper vessel provided with a stirrer suitable for mixing a stock of about 2.2% consistence. In this bleaching treatment, a predetermined amount of chlorine water of known strength was added to the pulp. These experiments showed that the strength properties of the pulps could be retained when they were bleached to a whiteness of 82 parts as measured by the Ives apparatus.

The high alpha-cellulose values for the pulps of Bleaches 507, 508, and 509 indicate a weakening of the primary walls *(13, 14)* of the fibers, which results in a loss of pulp strength. In such cases the major portions of the individual fibers have apparently not suffered degradation. Bleaches 515 and 516 were therefore handled more cautiously to prevent destruction or degradation of the primary walls of the fibers. In these bleaches, the pulp was extracted with a solution containing only 1% of its weight of NaOH. Low temperatures were employed both in the extraction stage (50 deg. C.) and in the first hypochlorite bleaching stage (approximately 30 deg. C.), the quantities of calcium hypochlorite employed were inadequate to produce a pulp of a high degree of whiteness, and the hydrogen ion concentration of the solution during the hypochlorite stages was maintained above a pH of 8. The results of this treatment were similar to those obtained in Bleaches 511, 512, and 513 (Table IV); namely, a bleached pulp of low color but of good strength characteristics was obtained. Further treatment of the pulp from Bleach 515, with a mild caustic extraction and a mild bleaching treatment with calcium hypochlorite, increased its color (*See* Bleach 518, Table IV) from a whiteness of 81 to 82 parts. After this treatment, the bursting strength of the pulp (Bleaches 515 and 518) decreased but the strength values as a whole remained fairly constant. As previously mentioned, the pulp from Bleach 516 was finished off with two mild permanganate treatments which raised its whiteness (*See* Bleach 519) from 82 to 86 parts. The strength characteristics of the bleached pulp were not materially affected by this treatment.

The pulp from Digestion 2513 (Table III), a short, rapid, high-temperature (180 deg. C.) digestion, required more chlorine for bleaching than any of the other pulps. A 7.0% charge of elemental chlorine used in the first stage proved to be inadequate. Hence, in addition to a hypochlorite treatment the pulp was finally given two successive treatments with potassium permanganate, employing 1.0 and 0.5% respectively, of this chemical. At a whiteness of 84 parts the strength values of the bleached pulp compared favorably with those obtained from the previously mentioned Bleaches 518 and 519.

## Processing and Machine Runs

As in previous experiments *(2)* the production of high-grade bond papers from southern pine of high summerwood content was not entirely satisfactory. Even though the unbleached pulp itself did not possess high strength, the processing and paper machine data, recorded in Table V, indicate that not all the difficulties encountered in the production of a high-quality paper from this type of wood are due to the pulping and bleaching treatments. There is the possibility that a pulp consisting mostly of thick-walled summerwood fibers cannot be successfully bleached to a high degree of whiteness (87 parts) and still retain its maximum strength. Then too, the coarse summerwood fibers may require machine manipulation beyond that available on the Laboratory experimental paper machine.

However, the results of the individual paper machine trials indicated that the bond-type papers from machine Run 1521 and 1579 (Table V) were of good formation and general appearance, but of only fair strength. Machine Run 1595, and consequently machine Run 1596 (Table V) made from the "broke" of Run 1595, indicated excess beating of the pulp. Nevertheless, the papers resulting from these tests

TABLE V.—PROCESSING DATA FOR MACHINE RUNS ON HIGH DENSITY SLASH PINE BLEACHED SULPHATE PULP

| Furnish | | | | | | | | Beater treatment and results | | | | | | | Jordan treatment | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Machine run | Digestion | Bleach | Titanox, % | Rosin size, % | Alum, % | pH | Other | Beater run | Consistence, % | Roll setting, 0.001 in. | Time at roll setting, min. | Freeness S.R., cc. | Bursting strength, pts./lb./ream | Tearing strength, grams/lb./ream | Double folds, no. | Jordan run | Jordan | Consistence, % | Plug speed, r.p.m. | Gage pressure, lb./sq. in. |
| 1521 | 2507-8 | 507 | 2.5 | 1 [1] | (1) | 4.5 | Color [2] 10 percent broke | 1171 | | 55 | 15 | ... | 0.5 | 2.12 | 25 | 447 | 1 | ... | 300 | 20 |
| | | | | | | | | 1172 | | 55 | 30 | ... | ... | 1.60 | 50 | | | | | |
| | | | | | | | | 1173—Entire furnish | | 0 | 55 | | | | | | | | | |
| 1579 | 2509-10 | 508 509 510 | 2.0 | 1.5 | [3] 2.5 | 4.5 | Color [4] 10 percent broke | 1184 | .. | 5 | 20 | ... | 0.28 | 1.10 | 7 | 455 | 2 | ... | 600 | 30 |
| | | | | | | | | 1185 | .. | 90 | 50 | | | | | | | | | |
| | | | | | | | | 1186—Entire furnish | | | | | | | | | | | | |
| 1595 | 2511-12-13 | 517 [5] 518 519 | 2.0 | 1.5 | (1) | 4.5 | Color [6] 15 percent broke | 1188 | 2.1 | 9 | 35 | | | | | 457 | 1 and 2 in parallel | 2.14 | 600 | 15 |
| | | | | | | | | 1189 | 2.1 | 4.5 | 11 [7] 30 | 870 | .60 | 3.00 | 30 | | | | | |
| | | | | | | | | 1190 | .. | 4.5 | 11 [7] 6 45 | 750 | .80 | 2.28 | 314 | | | | | |
| | | | | | | | | 1191 | .. | 4.5 | [7] 6 60 | 635 | 1.00 | 2.30 | 882 | | | | | |
| | | | | | | | | 1192—Entire furnish | | | | 465 | 1.00 | 1.70 | 400 | | | | | |
| 1596 | Broke from machine run 1595 | | | | | | | | | | | 670 | .62 | 2.00 | 300 | | | | | |

[1] Alum as required on the machine.
[2] Dry broke consisted of 50% red gum and 50% loblolly pine bleach sulphate; color—crystal violet.
[3] 2.5% alum insufficient. Additional alum was added as required.
[4] Broke from machine Run 1521. Color—crystal violet.
[5] This furnish was too tough for jordans and so it is likely that beating to a freeness of 600 would be a good beating treatment. This might and probably would result in an opacity, lower than sulphite bond but no lower than rag bond.
[6] Broke from machine Run 1521. Color—Pontamine blue AX.
[7] Time necessary to get down to the roll setting of 0.0045 inch.

TABLE VI.—PHYSICAL PROPERTIES OF BOND PAPER MADE FROM HIGH DENSITY SLASH PINE PULP TESTS MADE AT 65% RELATIVE HUMIDITY AND 72 DEG. F.

| Machine run | Ream weight, 25x 40—500 | Caliper, 0.001 inch | Solid fraction | Burst, pts./lb./ream | Tear, grams/lb./ream | Tensile, lb./sq. in. | Double folds, number | Stretch, % | Porosity, seconds | Size number | Opacity, % | Gloss, % | Ash, % | Color (Ives parts) Red | Green | Blue | Beater run | Jordan run | Bleach run | Digestion |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1521 | 55.7 | 3.52 | 0.59 | 0.36 | 1.10 | 4,350 | 25 | 4.7 | 147 | 1.76 | 81 | 40.7 | 3.1 | 91 | 90 | 89 | 1171-2-3 | 447 | 507 | 2507-8 |
| 1579 | 55.9 | 3.90 | .53 | .29 | 1.02 | 3,660 | 11 | 4.4 | 31 | 1.20 | 80.5 | 30.8 | 2.3 | 90 | 90 | 88 | 1184-5-6 | 455 | 508-09-10 | 2509-10 |
| 1595 | 53.4 | 3.73 | .52 | .49 | 1.70 | 5,170 | 179 | 6.8 | 193 | 1.46 | 80 | 33.5 | 2.5 | 85 | 85 | 85 | 1188-1192, inclusive | 457 | 517-18-19 | 2511-12-13 |
| 1596 | 49.6 | 3.62 | .51 | .39 | 1.50 | 3,940 | 58 | 6.5 | 171 | 1.04 | 85 | 29.6 | 3.7 | 83 | 82 | 83 | Broke from machine run 1595 (Starch added) | | | |

indicated that through proper bleaching and processing the production of bond papers from this type of slash pine is altogether possible.

## Conclusions

A lack of correlation was found between the summerwood-springwood content of the wood and the pulp properties of high-density slash pine. This would indicate that the springwood has thicker walls than does the more rapidly grown wood of the same species. Nevertheless, microscopical examination of a cross-sectional piece of the high-density wood did not confirm such an inference.

The preponderance of summerwood in the high-density slash pine indicates the possibility of certain changes in the fibers during the cooking process. More complete removal of the lignin and a reduction in wall thickness, for example, could account for the higher strength values of the easier-bleaching pulps over those of the milder-cooked kraft type. Because the thickness of the walls of the major portion of the fibers (summerwood) in this material is so much greater than is commonly found in southern yellow pines grown under more favorable conditions, a longer penetration period and a reasonably low digestion temperature is desirable for pulping this high-density, high-summerwood material.

Except for certain purposes, kraft pulps made from this kind of wood would undoubtedly be inferior in many respects to pulps prepared from normal-growth wood of the southern yellow pine group. Although normal-growth slash pine is much superior to this material, for the production of a high-grade bond paper, it is not altogether impossible to produce a bond paper of fair quality from high-density slash pine. Processing and machine problems arising from the nature of these fibers add to the difficulties of their economical utilization.

Wood selection therefore appears to be essential to the fullest utilization of slash pine as well as the southern pines in general.

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# The Mechanism of Softening Paper

By C. M. Connor[1] and A. H. Nadelmann[2]


## Abstract

*Two explanations for the process of plasticizing or softening of papers have been offered in previous publications: hygroscopic action and fiber lubrication. Hygroscopic action cannot be responsible for softening at low relative humidity of the surrounding atmosphere. The process of fiber lubrication is closely related to the process of fiber swelling, both being based to a certain degree on adsorption phenomena. The purposes of softening and the structural prerequisites for the efficiency of softeners are discussed. The introduction of a unit of softening is propounded.*


This paper deals particularly with the mechanism of softening glassine and greaseproof papers and is offered as a contribution to the knowledge of the theory of softening paper. Many conclusions, drawn originally in connection with the softening of glassine and greaseproof papers, may hold true in the field of vegetable parchment, paper toweling, tissues, and kindred materials which in general are treated with softeners.

It is not the object of this paper to offer a new theory of softening, but rather to call attention to


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adsorption phenomena on the surface of the swollen cellulose fiber when softeners are used. This way of approach greatly aids in understanding the mechanism of softening and should be useful in developing a theory of softening paper.

### Nomenclature

The expressions "softener," "softened" and "softening" are used intentionally instead of the words "plasticizer," "plasticized," and "plasticizing." The latter ones imply properties which are typical for plastics, in other words for substances which, according to Webster *(1)*, are capable of being deformed continuously and permanently in any direction without rupture under a stress exceeding the yield value. That paper does not assume the properties of a typical plastic by treatment with a plasticizer is evident.

The expressions softener, softened, and softening on the other hand convey that paper by treatment with a softener obtains or retains the quality of softness, a property which has been defined by Clark *(2)* and which can be evaluated and measured by means of a softness tester according to TAPPI Standard T 451 m-40 *(3)*.

### Historical Survey

The Nonfibrous Raw Materials Committee of the Technical Association of the Pulp and Paper Industry started giving short reports on plasticizers in 1936 and has been continuing to do so *(4, 5, 6, 7)*. They mentioned the materials in practical use and in experimental stage, listed the fields of application, and discussed the qualities and properties of the individual softener. Of these four reports the one for 1939 contained for the first time statements regarding the theory of softening. The authors contend that "softening is still accomplished by incorporating one or more hygroscopic materials in the article to be softened, the softness being produced mainly by the added moisture, although some effect may be caused by a lubrication of the fibers. Efforts to use non hygroscopic plasticizers have been unsuccessful" *(7)*.

More elaborate work has been done in laboratories of companies interested in manufacture and sale of a particular kind of softener. Leete *(8)* emphasizes the value of invert sugar as a softener and plasticizer in the manufacture and converting of paper. Interesting is his statement that, under proper conditions, pulp is able to absorb or bind a more or less definite amount of invert sugar in such a manner that it cannot be washed out by water.

Pike *(9)* presents in his paper on invert sugar as a plasticizer results of a good deal of experimental work and gives a detailed contribution to the knowledge of the mechanism of softening. He contends that softening of paper is the result of fiber lubrication. This lubrication is caused either by hygrocopicity of the softener and consequently increased moisture content of the fibrous material or by actual lubricating properties of the softener. Pike differentiates between: (1) lubricating, nonhygroscopic softeners—e. g., essential oils and water-miscible mineral oils; (2) nonlubricating, hygroscopic salts; and (3) lubricating and hygroscopic softeners—e. g., glycerine, invert sugar, corn syrup, dextrose, glycols, mannitol, and sorbitol.

By plotting varying percentages of relative humidity of the test room against the results of moisture content determinations of softened and of untreated sheets of greaseproof papers, Pike finds that at relative humidities below 60% sheets treated with 5% of a softener contain less moisture than untreated sheets; 5% glycerine is used as softener for one series of experiments and 5% invert sugar for another series. These interesting findings, Pike continues, are only true if small percentages of softeners are used. Larger percentages of softeners—e. g., 25%, are able to hold, at 60% relative humidity, more moisture in the paper than is held in untreated paper at that relative humidity. Pike comes to the conclusion that softeners do not depend solely on an increased moisture content for their effect. His assumption is based on the fact that, at any humidity and for any amount of softeners retained, treated samples are much softer than the untreated blank. His experiments to obtain retention of invert sugar, added in the beater, were not successful. Variation of hydrogen ion concentration did not influence these results.

Many facts pertaining to the use of glycerine in paper making have been compiled and reported by Leffingwell and Lesser *(10, 11, 12)*. As to the theory of softening, they assume that glycerine exhibits a dual softening function of increasing the moisture content of the paper and serving to lubricate the fibers. Papers containing hydrated cellulose use the action of glycerine to maintain the pliability, according to the authors.

Hardenberg *(13)*, in his experimental work on glycerine treated paper towels and tissues, finds, in agreement with Pike that 5% glycerine in paper decreases the moisture content of the sheet at low relative humidity, but that at high relative humidity a considerable moisture pick-up is to be observed. His results show that losses of glycerine in the temperature range from 100 to 120 deg. F. decrease as smaller percentages of glycerine are used.

In addition to the above publications Frorer's *(14)* and Matagrin's *(15, 16, 17)* papers on sorbitol and its use and the publications by Wrede *(18, 19)* about the use of glucose in the paper industry may be mentioned.

### Softening by Hygroscopic Action

A substance which attracts water from the air until the water vapor pressure of the substance is in equilibrium with the relative humidity of the surrounding atmosphere is a hygroscopic one. The attracted water may be adsorbed at a face or absorbed by the substance. In the latter case it may dilute a liquid, dissolve a solid, or form definite hydrates. Glassine and greaseproof papers are, like paper in general, hygroscopic substances. We know that they are soft, if in moisture equilibrium with air of high relative humidity, but that their softness decreases if the moisture content of the surrounding atmosphere is lowered.

The idea of adding to the paper a substance which increases hygroscopicity is a sound one, because increased hygroscopicity means increased moisture content of the sheet and this results in improved softness.

One of the problems of the manufacturer of glassine and greaseproof papers is the production of a sheet which stays soft even under extremely dry conditions in steam heated converting plants. Under these conditions the relative humidity drops in such plants to 40% or lower. It has been observed that softeners do not appear to exert any beneficial effect

to the paper by virtue of their hygroscopicity at 40% relative humidity. Since exact data on glycerine *(20)* are available, this substance may serve as an example. At 40% relative humidity glycerine is in equilibrium with the surrounding atmosphere only if it contains 15% water. If more water is present, a mixture of water and glycerine in certain proportions will evaporate. In other words, a glycerine-treated sheet loses moisture. If less water than 15% is present, the glycerine will try to obtain water. In this endeavor it will go the *via minoris resistantiae*, the path of least resistance and will satisfy its "thirst" first of all from the well wetted and swollen fiber. As this process of dehydration of the fiber proceeds, the glycerine will even give off part of its newly gained moisture to the surrounding dry atmosphere. That is why Pike *(9)* as well as Hardenberg *(13)* found that the moisture content of greaseproof papers and paper toweling decreases at low humidity, if treated with 5% glycerine.

Glycerine is an excellent softener even at low relative humidity. However, this softening effect seems not to result from the hygroscopicity of the softener and must be caused by other reasons under extremely dry conditions. Despite the fact that we do not have experimental data showing the relationship between relative humidity and concentration for other softeners, it still may be assumed that this conclusion can be applied to other softeners.

### Softening by Fiber Lubrication

Another theory of softening which has been considered is the one depending on fiber lubrication. A short general discussion of the mechanism of lubrication may aid in understanding this softening action.

#### Mechanism of Lubrication

Lubricants are used to reduce or eliminate dry friction between two solid faces. Friction between solids is caused by unbalanced molecular attractions of faces which are in sufficiently good contact.

The mechanism of lubrication has been described by Hardy *(21)*, Adam *(22)*, Chower *(23)* and others. Todays conception of lubrication differentiates between: (1) boundary lubrication (thin film or incomplete lubrication), and (2) fluid lubrication (thick film or complete lubrication).

#### Boundary Lubrication

The lubricating effect of a boundary film on a solid face depends on the chemical nature of the solid and of the lubricant. The structure of the boundary film is similar to that of condensed monomolecular films of long chain molecules on water. The reactive polar end, consisting of—OH or —COOH groups (for example) is firmly attached to the solid face. The less reactive part, the nonpolar end, is arranged in a steep angle to the face. This arrangement holds true only for the monomolecular layer immediately attached to the solid. The attraction between the molecules of the lubricant appears to be less than that between the initial layer and the solid face.

No liquid is known which is an equally good lubricant on all faces. The efficiency of boundary lubrication is determined by many different factors. Some of these are: the structure of the molecules adsorbed at the interface, the adsorptive force at the solid-liquid interface, which varies with the nature of the solid and of the liquid, the structure of the solid face as well as others. Viscosity of the lubricant does not seem to be of importance in boundary lubrication.

#### Fluid Lubrication

In fluid or complete lubrication, the lubricating film is so thick that the molecules of the lubricant are beyond the range of the action of the unbalanced molecular attraction of the solid face. Therefore the frictional resistance is not influenced by the chemical constitution of the lubricant or the nature of the solid face but is affected only by the internal friction of the lubricant itself, in other words by the viscosity of the lubricant. That is why viscous nonpolar compounds, as for instance mineral oils, are used for fluid lubrication.

### Softening by Fiber Swelling

Swelling of fibers and boundary lubrication are closely related processes since both are based on adsorption phenomena.

The knowledge of the structure of the cellulose fiber and its surface has been increased during the last fifteen years. Recently Landt and Rulon *(24)* gave an excellent survey on this subject. We see from their work that the beating process exposes the surfaces of the cellulose micelles which are studded with reactive—OH groups. According to Gortner *(25)* the affinities which exist in a colloid system between the disperse phase and its reactive groups on the one hand, and the dispersion medium on the other hand, are in direct proportion to the tendency of the system to gelate or to swell. Gortner mentions that, due to the strong attraction of the disperse phase, the particles of this phase become surrounded by "shells" of the dispersions medium with a resulting increase in viscosity, or in the case of cellulose pulp, an increase in slowness. In this case we have to take into account electrical attractions, interfacial tension forces, and orientation of the molecules, all of which are active at the surface.

Since swelling of cellulose fibers is associated with increase of elasticity, plasticity, and softness of the material, the close relationship between the swelling process by beating in water and the softening process at least of glassine and greaseproof papers by treating with softeners seems evident.

Kress and Bialkowsky *(26)* may have been conscious of this fact when they used in their investigations of hydration some of the substances which are being used as softeners. They compared the development of pulp in different vehicles and found that ethylene glycol made the stock slow up quicker than water. Glycerine made the stock so heavy after a short time that the experiment was discontinued. On the other hand, monovalent aliphatic alcohols decreased in swelling efficiency with increasing molecular weight. Pulp developed in methyl alcohol gave results similar to stock in water. Beating in butyl and amyl alcohol did not give any fibrillation. These results are in good agreement with determinations of the swelling power of cellulose conducted with the dilatometer of Posniak and Rowland.

Since the beating and swelling of cellulose in water and the softening and swelling of fibers of glassine stock by means of softeners are similar procedures, it is evident that both processes are based on adsorption. However, it has to be pointed out that this similarity is particularly characteristic of glassine and greaseproof stock due to the fact that a high

proportion of the total moisture content of the glassine and greaseproof sheet is surface-bound water of swelling. The similarity between beating and swelling in water on the one hand and softening and swelling by means of softeners on the otner hand may not be so pronounced in the case of ordinary paper.

Some points may be repeated in order to show that this conception of softening is compatible with the theory of softening by lubrication which has been propounded in previous publications.

In a nonsoftened sheet of paper we find: (1) surface-bound or surface-adsorbed water which swells the fibers; and (2) capillary condensed water.

In lubrication we have to deal with: (1) boundary lubrication by a thin film of adsorbed lubricant; and (2) fluid lubrication by a thick film of lubricant, which is not adsorbed unto the surface.

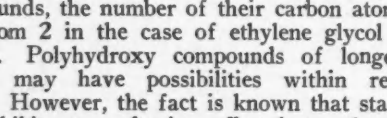
In a softened sheet of glassine or greaseproof paper the softener may be found: (1) as surface bound or surface adsorbed softener; and (2) as excess softener which is beyond the range of the adsorptive force of the surface of the cellulose fiber and which is deposited in the capillary interstices of the paper. The similarity of these three cases is evident.

## Object of Softening

Treatment with softeners may serve a dual purpose, either to maintain the intial softness of paper over a prolonged period of time or to make paper by treatment softer than untreated paper. It is possible to maintain the intial softness of paper for a prolonged period of time by substituting adsorbed water molecules for molecules of compounds which on the one hand exert equal swelling efficiency on the fiber and which on the other hand are not as easily and copiously desorbed from the fiber when aging and syneresis occurs. An increase in softness may be imparted to paper either by use of softeners which possess fiber swelling efficiency higher than water or by having softener capillary condensed, or adsorbed in addition to the surface bound water.

To accomplish these ends appropriate molecular structure of the softener is necessary. Softeners for paper need active —OH groups. Since it is known that increasing molecular weight of monovalent aliphatic alcohols decreases their fiber swelling efficiency, the active —OH group of softeners should not be attached to long hydrocarbon chains. Softeners for paper in commercial use are mostly polyhydroxy compounds, the number of their carbon atoms ranging from 2 in the case of ethylene glycol to 6 in sugars. Polyhydroxy compounds of longer chain length may have possibilities within reasonable limits. However, the fact is known that starches do not exhibit any softening effect but rather tend to impart stiffness.

In order to check whether our conception of structural prerequisites for softeners of paper is correct or not, the softening action of triethanolamine was investigated which substance possesses a certain structural similarity to glycerine. This similarity may be seen easily in the following:



As expected, this substance showed excellent softening efficiency for glassine and greaseproof papers. Unfortunately, its alkalinity, its tendency to absorb carbon dioxide, and its poor light resistance preclude its present commercial use in the glassine and greaseproof field. A recent European publication *(27)*, however, recommends triethanolamine as one substitute for glycerine.

## Future Work

It is therefore quite easy to select materials on the basis of molecular structure which will fit into the pattern of an ideal softener. However, it can be seen that the work in this field has not developed, as yet, to a point where one can blindly select, on structure alone, a suitable substance for softening of all papers. Study of the literature and discussions with experts in the field all tend to emphasize this fact that in deed only the surface of this interesting subject has been scratched.

Since several methods of measuring swelling efficiency of softeners for cellulose fibers are known and since instruments to measure softness of paper are available, a thorough investigation of the subject of softening paper based on new experimental data should yield useful results. This experimental work should have as one objective the finding of new compounds to be used in softening paper as well as the improvement of the efficiency of present softeners. Then too, there is a need for a new unit of measurement of softener efficiency. Such a unit can be arrived at from experimental work and it is suggested that thought be given to this phase in connection with any investigations that may now be in progress. Such a unit would enable the industry to standardize softeners and to relate them to improvements in that sheet characteristic referred to as *softness*. These are but two of many results which might come from work in this field.

No outlined program for action is proposed, but it is hoped that consideration of the subject matter of this paper may result in an increase of knowledge in a field which becomes increasingly important economically and technically each year.

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# Imports of Paper and Paper Making Stock

## Giving Manifests of New York, Boston, Philadelphia and Other Ports of Newsprint, Wrapping, Writing, Coated, Blotting, Tissue, Strawboard; Bleached Sulphite More Acute—Some Grades of Old Waste Lower.

**Effective September 30, 1939, under Treasury Decision 49,970, all publications, exchanges and trade associations were denied access to import manifests at the New York Customs House. The Paper Trade Journal and other interested parties have vigorously protested this ruling, and as soon as the order of the Treasury Department is modified or rescinded, full publication of all manifests will be resumed in these columns. In the interim, the Paper Trade Journal is making every possible effort to gather all available information from manifests, at various outside sources.**

### NEW YORK IMPORTS

WEEK ENDING AUGUST 30, 1941

SUMMARY

Cigarette paper.....324 cs.
Newsprint .....13,017 rolls
Aluminum paper.....90 cs.

CIGARETTE PAPER

E. F. Pipe & Co., ——, Barcelona, 62 cs.
National City Bank, ——, Barcelona, 2 cs.
——, ——, Lisbon, 100 cs.
Garcia & Diaz, ——, Lisbon, 20 cs.
E. F. Pipe & Co., ——, Barcelona, 40 cs.
——, ——, Barcelona, 100 cs.

NEWSPRINT

H. G. Craig Co., Inc., ——, Donnacona, 358 rolls.
——, ——, Comeau Bay, 3,548 rolls.
H. G. Craig Co., Inc., ——, Donnacona, 364 rolls.
International Paper Co., ——, Gatineau, 334 rolls.
H. G. Craig Co., Inc., ——, Donnacona, 346 rolls.
——, ——, Comeau Bay, 7,735 rolls.
International Paper Co., ——, Gatineau, 332 rolls.

ALUMINUM PAPER

Rohner Gehrig & Co., ——, Bilbao, 90 cs.

RAGS, BAGGINGS, ETC.

Darmstadt Scott & Courtney, ——, Vera Cruz, 72 bls. gunny waste.
Atlas Waste Manfg. Co., ——, Havana, 10 bls. cotton sweepings.
Murbas Trading Corp., ——, Buenos Aires, 23 bls. hemp rags.
Williamson Products Corp., ——, Santos, 270 bls. cotton linters.
New England Waste Co., ——, Rio de Janiero, 1,309 bls. cotton linters.
——, ——, Rio de Janiero, 898 bls. cotton linters.
C. Comiter, ——, Rio de Janiero, 59 bls. cotton residue.
——, ——, Rio de Janiero, 100 bls. cotton residue.
Schimmel Trading Corp., ——, Rio de Janiero, 322 bls. cotton residue.
New England Waste Co., ——, Santos, 1,364 bls. cotton linters.
Williamson Products Corp., ——, Santos, 194 bls. cotton linters.
J. Ballay & Co., ——, Buenos Aires, 150 bls. cotton linters.
New England Waste Co., ——, Buenos Aires, 1,037 bls. cotton linters.

BONE GLUE

Biological Raw Products, Inc., ——, Buenos Aires, 300 bags.

CASEIN

National City Bank, ——, Buenos Aires, 90 bags.
Chemical Bank Trust Co., ——, Buenos Aires, 500 bags (lactic).
American British Chemical Supplies, ——, Buenos Aires, 417 bags (lactic).
A. Hurst & Co., ——, Buenos Aires, 417 bags (ground lactic).
Chase National Bank, ——, Buenos Aires, 417 bags (lactic).

## To Make Gun Powder Containers

The Research Corporation, an affiliate of Reynolds Metals Company, has added 125,000 square feet of manufacturing space to its plants in Louisville, through the leasing of the block-square American Oak Leather plant on 11th Street in that city. About a quarter of a million dollars will be spent in modernization of the building and the installation of machinery for the manufacture of metal capped paper containers for use in shipping gun powder. According to V. M. Moody of the Reynolds company, the plant will be in operation about November 1.

Due to the nature of the product, no figures or estimates of production have been made. During the previous World War the Reynolds company's sole activity was the manufacture of similar containers, based on designs originated by R. S. Reynolds, president of the company. At that time, production rose to over fifty carloads of these containers daily.

About 200 skilled tube winders will be employed in the new factory, it was said. The Reynolds company operates six other plants in Louisville, mainly engaged in the fabrication of strong alloy aluminum for national defense production, employing about 3,500 men and women. Plants in other cities run the total of Reynolds factories up to thirty, covering the production of aluminum from bauxite, on through various processes of rolling, extruding, or otherwise converting the product for various war and defense needs.

## To Manage Sales of Collins Mfg. Co.

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Penn., September 2, 1941—The A. M. Collins Manufacturing Company has taken over the sales management of the Collins Manufacturing Company, North Wilbraham, Mass. L. E. Macy, president of the A. M. Collins concern, is now acting as general manager of the Collins Manufacturing Company. New sales offices have been established in the Chanin Building, 42nd street and Lexington avenue, New York. The present grades will be continued, although definite improvements in methods of manufacture are planned for the near future.

## Paper Box Shipments Off in July

Shipments of folding paper boxes into the metropolitan New York area during July by members of the Folding Paper Box Manufacturers Association totaled $924,958, compared with $992,941 in June, the association reported yesterday. Shipments in July, 1940, totaled $685,234.

# New York Paper and Pulp Market Review

## Paper Market Strong Under Active Demand For Many Grades—Chlorine Supply Continues To Be Discussed By Representatives of Industry and OPACS—New Differentials For Old Waste Paper.

Office of the PAPER TRADE JOURNAL,
Wednesday, September 3, 1941.

Growing anxiety is reflected in reports received from many manufacturers' representatives, jobbers, and general paper merchants this week in reference to the difficulty of securing deliveries of all the paper and paper board required to meet the current record-breaking demand. No relief for the situation appears likely, however, as the requirements of the Government have been very greatly increased under the national defense program. The chlorine situation is also expected to become increasing critical in the future.

Paper production for the week ended August 25 was estimated at 102.8%, compared with 84.7% for 1940, with 80.4% for 1939, with 80.1% for 1938, and with 83.3% for the corresponding week for 1937.

Paper board production for the week ended August 25 was 94.0%, compared with 74.0% for 1940, with 72.0% for 1939, with 69.0% for 1938, and with 74.0% for the corresponding week for 1937.

Production of most paper mills is reported continuing at capacity, with some of the smaller mills forced to curtail output because of the inability to obtain pulp to maintain full capacity operations. Reports reflect the difficulty of some converting mills is becoming more serious.

A flood which occurred along the Wisconsin River is reported to have caused substantial damage to dams and forced some mills in this industrial area to shut down this week.

As demand for paper and paper board is running so far ahead of productive capacity, the market is very firm. Considerable pressure is being exerted on paper prices through the extremely heavy demand. The attempt of the OPACS to stabilize all prices at what that department considers to be a reasonable price level has acted as a brake on prices. It is questioned, however, in some quarters of the trade, if it is a wise policy to attempt to fix "ceiling" prices at a relatively low level for paper when pulp prices are high out of line in comparison.

Higher newsprint prices talked about for some weeks, appear unlikely now. The Canadian International Paper Company and the International Paper Sales Company of Canada, announced on September 2 to their domestic customers that International's standard prices for the last quarter of this year and the first quarter of 1942, extending through September, 1941, to April 1, 1942, will be unchanged at $50 per ton.

No important change in the price of any grade of paper has been reported at this date.

### Chemical Pulp

The chemical pulp market continues very active and this market is in a strong position. Wood pulp stocks in the paper grades of sulphite and sulphate, have shown a steady decline since April, 1940, and paper and paper board mill stocks aggregated 676,200 tons, compared with 391,800 tons on July 1, 1941. Total dock stocks, foreign and domestic, including all grades of wood pulp, declined from 323,000 tons on April 1, 1940, to 82,400 tons on July 1, 1941.

Since the recent upward revision in the maximum prices in some grades of chemical pulp, no change in contract prices has been reported.

### Rags

Rag prices are firm and while the trend appears upward on the new cotton grades, no important change from the upward revised prices of last week has occurred at this date.

### Old Rope and Bagging

Active demand and a limited supply continues to maintain a strong market in old Manila rope. Jute threads and sisal strings are very firm and current quotations are higher.

Old bagging prices have been revised upward this week and domestic gunny is currently quoted at from 4.50 to 4.75.

### Old Waste Paper

Higher prices are reported this week on ordinary hard No. 1 white envelope cuttings, on overissue magazines, solid flat book and on white ledger stock. The new differentials on the bulky grades under Government determination are now in effect on strictly overissue news, at from .65 to .75; corrugated, at from .82½ to .90; and No. 1 mixed paper at from .57½ to .65.

### Twine

Active demand for all grades of twine and an increasing use of cotton to cover the shortage of imported fibers, is indicated in current trade reports this week. Prices are of a nominal nature in most imported fibers and customers are limited to what manufacturers consider to be reasonable quantities.

## To Observe Fire Prevention Week

In accordance with its annual custom of directing attention to the annual observance of Fire Prevention Week, October 5-11, the National Fire Protection Association, a non-profit technical and educational organization, states that business and industry has been responsible for the majority of advances that have been made in fire prevention and protection.

The association points out that now, with defense the major issue in every American's mind, it is fire which threatens our internal safety more than any other destructive agency. Not only must we continue to contend with fires originating largely from carelessness, which involve some 10,000 lives and $300,000,000 annually, but we must now take into consideration war incendiarism, sabotage and incendiary bombs.

# PUT A BAUER PREPARED SHEET THROUGH LABORATORY TESTS!

● The next time you see a sheet of paper prepared on Bauer double-disc pulpers, analyse it. You'll notice three things:

**1** **There will be little evidence of cutting or shortening.**

**2** **You'll find a high Mullen with excellent freeness and formation.**

**3** **You'll notice that tear and fold are well preserved.**

Get these results on your papers by specifying Bauer pulpers. Built for kraft knotter and screen rejects, semi-chemical and semi-sulphite pulps, ground wood screening, boxboard, and container. Two sizes are available . . . 24″ and 36″ . . . each with a wide variety of disc patterns.

Write for details.

## THE BAUER BROS. CO. SPRINGFIELD, OHIO

# THE ANSWER IS IN KALAMAZOO

?

Do you want to know How and Where to secure paper mill tanks that cost less, give better and cleaner service — and last longer? The answer is in Kalamazoo!

*Manufacturers of wood tanks for 60 years.*

KALAMAZOO TANK & SILO CO.

KALAMAZOO, MICHIGAN

# West Virginia Pulp and Paper Company

230 Park Ave.
New York

35 East Wacker Drive
Chicago

Public Ledger Building
Philadelphia, Pa.

503 Market St.
San Francisco, Cal.

Manufacturers of

**ENGLISH FINISH SUPERCALENDERED MACHINE FINISHED BOOK and LITHOGRAPHIC PAPERS**

**Offset, Envelope, Bond, Writing, Mimeograph, Ledger, Eggshell, Cover and Music Papers, Index Bristol, Post Card and Label Papers**

**HIGH GRADE COATED BOOK**

. . . .

**KRAFT WRAPPING AND KRAFT ENVELOPE**
**KRAFT LINER BOARD**
**BLEACHED SULPHITE AND SODA PULP**
**BLEACHED AND UNBLEACHED KRAFT PULP**

**MILLS:**

Mechanicville, New York
Luke, Maryland
Covington, Virginia
Tyrone, Pennsylvania
Williamsburg, Pennsylvania
Cass, West Virginia
Charleston, South Carolina

# MISCELLANEOUS MARKETS

Office of the PAPER TRADE JOURNAL,
September 3, 1941.

BLANC FIXE—Quotations on blanc fixe are firm and continue unchanged at prevailing market levels. Demand reported steady for the week. The pulp is currently quoted at $35 per ton in barrels, at works; the powder is offered at $50 per ton, f.o.b., works.

BLEACHING POWDER—Prices on bleaching powder are firm. Market reported active for the week. Bleaching powder is currently quoted at $2 per 100 pounds, in drums, at works.

CASEIN—Quotations on casein are higher. Demand active for the week. Standard domestic casein, 20-30 mesh, is currently quoted at 24 cents per pound; 80-100 mesh, at 24½ cents per pound; all prices in bags, car lots. Standard Argentina casein is currently offered at 23 cents per pound. No quotations on French casein.

CAUSTIC SODA—Prices on caustic soda are unchanged. Demand reported active for the week. Solid caustic soda is currently quoted at $2.30 per 100 pounds, flake and ground at $2.70 per 100 pounds, in drums, at works.

CHINA CLAY—Quotations on china clay are firm and continue unchanged this week. Domestic filler clay is currently quoted at from $7.50 to $15 per ton; coating clay at from $12 to $22 per ton, at mines. Imported clay is quoted at from $13 to $25 per long ton, ship side.

CHLORINE—Quotations on chlorine unchanged. Market under full priority control. Chlorine is currently quoted at $1.75 per 100 pounds, in single-unit tank cars, f.o.b., works.

ROSIN—Quotations on most grades of rosin are lower for the week. "G" gum rosin is currently quoted at $2.45 per 100 pounds, in barrels, Savannah. "FF" wood rosin is currently quoted at $2.45 per 100 pounds, in barrels, New York. Seventy per cent gum rosin size is quoted at $2.96 per 100 pounds, f.o.b., works.

SALT CAKE—Prices on salt cake are firm. Demand active, with current quotations nominal. Domestic salt cake is currently quoted at $15 per ton in bulk; chrome salt cake at $16 per ton. All prices in car lot, f.o.b., shipping point. The quotation of $16 per ton on imported salt cake continues nominal.

SODA ASH—Quotations on soda ash are firm and continue to conform to prevailing market quotations. Demand reported active. Quotations on soda ash in car lots, per 100 pounds, are as follows: in bulk, $.90; in paper bags, $1.05; and in barrels, $1.35.

STARCH—Prices on corn starch are firm and continue unchanged for the current week. Pearl is currently quoted at $3.10 per 100 pounds; powdered starch at $3.20 per 100 pounds; all prices in bags, car lots, f.o.b., Chicago.

SULPHATE OF ALUMINA—Quotations on sulphate of alumina are firm. Demand reported good. Market strong. The commercial grades are currently quoted at $1.15 per 100 pounds; iron free at $1.80 per 100 pounds, in bags, car lots, f.o.b., works.

SULPHUR—Prices on sulphur are firm and continue to conform to prevailing market quotations. Annual contracts are currently quoted at $16 per long ton, f.o.b., mines. Spot and nearby car lots are quoted at $18 per ton.

TALC—Quotations on talc are firm and continue unchanged at prevailing market prices. Domestic talc is currently quoted at from $15 to $21 per ton, at mills. No quotations on imported talc.

# MARKET QUOTATIONS

## Paper

**(Delivered New York)**

| | | | |
|---|---|---|---|
| **News, per ton—** | | | |
| Roll, contract | $50.00 | @ | — |
| Sheets | 58.00 | " | — |
| **Kraft—per cwt.—Delivered Zone A** | | | |
| Northern, Extra Quality | $5.25 | @ | $6.00 |
| Superstandard | 4.87½ | " | 5.25 |
| Northern Standard Wrapping | 4.50 | " | 5.00 |
| Standard Wrapping | 4.50 | " | — |
| **Tissues—Per Ream—Carlots** | | | |
| White No. 1 | 1.07½ | " | — |
| White No. 1 M. G. | .97½ | " | — |
| White No. 1½ | .85 | " | — |
| White No. 2 | .85 | " | — |
| Anti-Tarnish M. G. | .90 | " | — |
| Colored | 1.00 | " | — |
| Kraft | .90 | " | — |
| Manila | .80 | " | — |
| Unbl. Toilet, 1 M. | 4.14 | " | — |
| Bleached Toilet | 5.60 | " | — |
| **Paper Towels, Per Case** | | | |
| Unbleached, Jr. | 3.80 | " | — |
| Bleached, Jr. | 2.30 | " | — |
| **Manila—per cwt.—C. l. f. a.** | | | |
| No. 1 Jute | 8.75 | @ | 10.75 |
| No. 1 Manila Wrapping, 35 lb. | 5.50 | " | 5.75 |
| No. 2 Manila Wrapping, 35 lb. | 5.25 | " | 5.50 |
| **Boards, per ton—** | | | |
| News | 48.00 | @ | — |
| Chip | 48.00 | " | — |
| Sgl. Mia. Ll. Chip | 60.00 | " | — |
| White Pat. Coated | 75.00 | " | — |
| Kraft Liners | 60.00 | " | — |
| Binders Boards | 80.00 | " | — |

**The following are representative of distributors' resale prices:**

**Rag Content Bonds and Ledgers—White, Assorted Items. Delivered in Zone 1:**

| | Bonds | | Ledgers | |
|---|---|---|---|---|
| 100% Rag Ext. No. 1 | $39.10 @ | $46.00 | $40.25 @ | $47.25 |
| 100% Rag | 31.05 " | 36.50 | 32.20 " | 37.75 |
| 85% Rag | .... " | .... | 29.90 " | 35.00 |
| 75% Rag | 23.60 " | 27.75 | 24.75 " | 29.00 |
| 65% Rag | .... " | .... | 21.65 " | 26.25 |
| 50% Rag | 17.55 " | 21.50 | 18.70 " | 22.75 |
| 25% Rag | 14.65 " | 17.75 | 15.80 " | 19.25 |

Colors at $1.00 cwt. extra.

**Sulphite Bonds and Ledgers—White, Assorted Items. Delivered in Zone 1:**

| | Bonds | | Ledgers | |
|---|---|---|---|---|
| No. 1 | $9.35 @ | $11.50 | $11.55 @ | $12.75 |
| No. 2 | 8.50 " | 10.25 | 9.65 " | 11.75 |
| No. 3 | 8.05 " | 9.25 | 9.20 " | 11.25 |
| No. 4 | 7.70 " | 9.50 | 8.90 " | 10.75 |

Colors $1.00 cwt. extra.

**Free Sheet Book Papers—White, Cased Paper.**

**Delivered in Zone 1:**

| | | | |
|---|---|---|---|
| No. 1 Glossy Coated | $11.90 | @ | $13.50 |
| No. 2 Glossy Coated | 10.35 | " | 11.75 |
| No. 3 Glossy Coated | 9.55 | " | 11.00 |
| No. 4 Glossy Coated | 9.15 | " | 10.50 |
| No. 1 Antique (watermarked) | 9.05 | " | 10.50 |
| No. 2 Offset | 8.40 | " | 9.75 |
| A Grade E. F. | 8.20 | " | 9.50 |
| A Grade S. & S. C. | 8.45 | " | 9.75 |
| B Grade E. F. | 7.65 | " | 8.75 |
| B Grade S. & S. C. | 7.90 | " | 9.00 |
| C Grade E. F. | 7.35 | " | 8.50 |
| C Grade S. & S. C. | 7.60 | " | 8.75 |
| D Grade E. F. | 7.10 | " | 8.25 |
| D Grade S. & S. C. | 7.35 | " | 8.10 |

Ivory & India at $.50 cwt. extra.

## Mechanical Pulp

**(On Dock, Atlantic Ports)**

| | |
|---|---|
| No. 1 Imported— | |
| Moist | No prices |
| Dry | No prices |

**(Delivered)**

| | | |
|---|---|---|
| No. 1 Domestic and Canadian | 40.00 | @ 42.00 |

## Chemical Pulp

**(On Dock, Atlantic, Gulf and West Coast Ports)**

| | | | |
|---|---|---|---|
| **Bleached Sulphite (Domestic and Foreign)—** | | | |
| Prime Bleached Sulphite | 3.72½ | @ | 4.50 |
| **Prime Qualities—** | | | |
| Easy-Bleaching Sulphite | 3.17½ | " | 4.25 |
| Strong Unbleached Sulphite | 3.17½ | " | 4.25 |
| **News Grade, delivered** | | | |
| Unbleached Sulphite | 61.00 | " | 64.25 |

**(On Dock, Atlantic Ports)**

| | | | |
|---|---|---|---|
| Kraft Bleached | 4.12½ | " | — |
| Kraft Light & Strong | No price | | |
| Kraft No. 1 | 3.60 | " | 4.75 |

**(F. o. b. Pulp Mill)**

| | | | |
|---|---|---|---|
| Kraft Domestic and Canadian | 2.75 | " | 3.37½ |

**(Delivered)**

| | | | |
|---|---|---|---|
| Soda Bleached | 3.30 | " | — |

Add 60 cents per short ton, dock charges for Albany; $2.50 for Lake Ports East and $3.50 for Lake Ports West of Mackinac Straits.

## Domestic Rags

**New Rags**

**(Prices to Mill f. o. b. N. Y.)**

| | | | |
|---|---|---|---|
| **Shirt Cuttings—** | | | |
| New White, No. 1. | 7.00 | @ | 7.25 |
| Silesias No. 1 | 4.25 | " | 4.50 |
| New Unbleached | 7.00 | " | 7.25 |
| Blue Overall | 5.00 | " | 5.25 |
| Fancy | 2.50 | " | 2.75 |
| Washables | 2.00 | " | 2.13 |
| Mixed Khaki Cuttings | 2.50 | " | 2.75 |
| O. D. Khaki Cuttings | 3.00 | " | 3.13 |

**Old Rags**

| | | | |
|---|---|---|---|
| **White, No. 1—** | | | |
| Repacked | 3.10 | " | 3.38 |
| Miscellaneous | 2.35 | " | 2.63 |
| **White, No. 2—** | | | |
| Repacked | 2.50 | " | 2.75 |
| Miscellaneous | 2.00 | " | 2.25 |
| **Thirds and Blues—** | | | |
| Repacked | 1.25 | " | 1.38 |
| Miscellaneous | 1.10 | " | 1.25 |
| **Roofing Rags—** | | | |
| No. 1 | 1.30 | " | 1.35 |
| No. 2 | 1.20 | " | 1.25 |
| No. 3 (bagging) | .95 | " | 1.00 |
| No. 4 | .90 | " | .95 |
| No. 5A | .90 | " | .95 |

## Foreign Rags

**All prices nominal**

**New Rags**

| | | | |
|---|---|---|---|
| New Dark Cuttings | 2.25 | @ | 2.40 |
| New Mixed Cuttings | 2.00 | " | 2.20 |
| New Light Silesias | 5.50 | " | 5.75 |
| Light Flannelettes | 5.50 | " | 5.75 |
| New White Cuttings | 7.00 | " | 7.50 |
| New Light Oxfords | 4.00 | " | 4.50 |
| New Light Prints | 3.00 | " | 3.25 |

**Old Rags**

| | | | |
|---|---|---|---|
| No. 1 White Linens | 7.50 | " | 8.50 |
| No. 2 White Linens | 6.50 | " | 7.50 |
| No. 3 White Linens | 4.50 | " | — |

# ZOPAQUE RG

**Pure $TiO_2$**

This grade of $TiO_2$ shows highest developments of aqueous dispersion and suspension yet attained.

"We appreciate the patience and cooperation of our customers during this period when our production is being pushed to capacity."

*Sole Selling Agents:*
The Chemical & Pigment Company
Baltimore, Md. · Collinsville, Ill. · Oakland, Calif.
*Manufactured by*
American Zirconium Corporation
Baltimore, Maryland

---

Volclay MOST COLLOIDAL BENTONITE
For the Paper Manufacturer
*Produced By*
**AMERICAN COLLOID COMPANY**
363 W. Superior St. — Chicago, Ill.

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**H. G. WEBER & COMPANY**
***Builder of High Speed Bag Machines***
Grocery, Duplex, Coffee, Flour, Cellophane Satchel Bottom, Tuber & Bottomers Automatic Compensating Device.
KIEL WISCONSIN

---

**INTERNATIONAL PULP CO.**
NEW YORK CITY
**ASBESTINE** FILLER
Reg. U. S. Patent Office 90% Retention

---

Appleton FELTS
MAKE GOOD PAPER
APPLETON WOOLEN MILLS, APPLETON, WIS.

---

# NELIO PURE GUM ROSIN *and* Rosin Size

Two thoroughly dependable gum rosin products made by modern scientific methods and free from the faults of ordinary gum rosin.

Investigate NELIO. In addition to its outstanding qualities of performance, its superior virtues offer economies in handling.

**NELIO IS UNIFORM**—Standard grades never varying in color and quality from drum to drum or shipment to shipment.

**NELIO IS BRILLIANT**—Assuring lighter grades of paper.

**NELIO IS DRY**—The turpentine content is extremely low.

**NELIO IS CLEAN**—Absolutely free of dirt and foreign matter. Manufactured in stainless steel equipment.

**NELIO IS FULL WEIGHT**—Shipped in standard, non-absorbent leak-proof metal drums, in 100-lb. net weight paper bags or in fluid state in insulated tank cars. Nelio Rosin size is shipped in liquid state in drums or tank cars.

**NELIO TECHNICAL SERVICE**—Consulting service by experienced paper technicians is available to paper mills on request.

***Write for samples and prices.***

Manufactured by
**THE GLIDDEN COMPANY**
NELIO RESIN PROCESSING CORPORATION
JACKSONVILLE FLORIDA

*Sold by*
**E. W. COLLEDGE General Sales Ag't. Inc.**
CHICAGO, 310 South Michigan Ave.
CLEVELAND, 616 Guardian Bldg.
NEW YORK, 300 Madison Avenue
SAN FRANCISCO, 503 Market Street

| | | | |
|---|---|---|---|
| No. 4 White Linens. | 2.25 | @ | 3.25 |
| No. 1 White Cotton. | 4.25 | " | 4.75 |
| No. 2 White Cotton. | 3.25 | " | 3.75 |
| No. 3 White Cotton. | 2.50 | " | 3.00 |
| No. 4 White Cotton. | 1.90 | " | 2.20 |
| Extra Light Prints.. | 2.00 | " | 2.40 |
| Ord. Light Prints... | 1.75 | " | 2.15 |
| Med. Light Prints... | 1.55 | " | 1.95 |
| Dutch Blue Cottons. | 2.25 | " | 2.50 |
| French Blue Linens. | 3.00 | " | — |
| Checks and Blues... | 2.00 | " | — |
| Linsey Garments.... | 1.90 | " | 2.00 |
| Dark Cottons..... | 1.50 | " | 1.60 |
| Old Shopperies..... | 1.30 | " | 1.45 |
| New Shopperies..... | 1.45 | " | 1.50 |
| French Blues..... | 2.25 | " | 2.50 |

### Old Rope and Bagging

(Prices to Mill, f. o. b. N. Y.)

| | | | |
|---|---|---|---|
| Gunny No. 1— | | | |
| Foreign ..... | Nominal | | |
| Domestic ..... | 4.50 | @ | 4.75 |
| Wool Tares, light.... | 2.50 | " | 2.75 |
| Wool Tares, heavy.. | 2.50 | " | 2.75 |
| Bright Bagging..... | 4.25 | " | 4.50 |
| Manila Rope— | | | |
| Foreign ..... | 6.00 | " | 6.25 |
| Domestic ..... | 6.00 | " | 6.25 |
| Jute Threads..... | 4.00 | " | 4.25 |
| Sisal Strings..... | 2.75 | " | 3.00 |
| Mixed Strings..... | 1.10 | " | 1.20 |

### Old Waste Papers

(F. o. b. New York)

| | | | |
|---|---|---|---|
| Shavings— | | | |
| White Envelope Cuttings ..... | 3.75 | @ | 4.00 |
| Ordinary Hard White No. 1.... | 3.25 | " | 3.50 |
| Soft White No. 1.. | 2.50 | " | 2.75 |
| Soft White Extra.. | 2.70 | " | 2.85 |
| Flat Stock— | | | |
| Stitchless ..... | 1.10 | " | 1.25 |
| Overissue Mag.... | 1.25 | " | 1.40 |
| Solid Flat Book... | 1.15 | " | 1.30 |
| Crumbled No. 1 .. | .70 | " | .75 |
| Ledger White Stock. | 2.20 | " | 2.35 |
| Ledger Stock Colored | 1.75 | " | 1.90 |
| Manila— | | | |
| New Env. Cut.... | 3.25 | " | 3.50 |
| New Cuttings..... | 3.00 | " | 3.25 |
| Old Kraft Machine Compressed bales.. | 2.00 | " | 2.10 |
| News— | | | |
| No. 1 White News | 1.50 | " | 1.60 |
| Strictly Overissue. | .75 | " | .80 |
| Strictly Folded.... | .65 | " | .75 |
| Corrugated ..... | .82½ | " | .90 |
| No. 1 Mixed Paper.. | .57½ | " | .65 |

### Twines

(F. o. b. Mill)

(Soft Fiber)

| | | | |
|---|---|---|---|
| Coarse Polished— | | | |
| India ..... | .20 | @ | — |
| White Hemp..... | .20 | " | — |
| Fine Polished— | | | |
| Fine India..... | .24 | " | — |
| Unpolished— | | | |
| Box ..... | .16¾ | " | — |
| Paper Makers..... | .16 | " | — |
| Tube Rope..... | .17½ | " | — |
| Wall Paper..... | .19½ | " | — |
| Wrapping ..... | .21 | " | — |
| Soft Fiber Rope... | .18 | " | — |
| Cotton ..... | .24 | " | — |
| (Hard Fiber) | | | |
| Medium Java..... | .15 | " | — |
| Mex. Sisal..... | .14 | " | — |
| Manila ..... | .26 | " | — |

## PHILADELPHIA

### Domestic Rags (New)

(Price to Mill, f. o. b. Phila.)

| | | | |
|---|---|---|---|
| Shirt Cuttings— | | | |
| New White No. 1. | .06¾ | @ | .07 |
| New White No. 2. | .04 | " | .04¼ |
| Light Silesias..... | .04½ | " | .04¾ |
| Silesias, No. 1.... | .04 | " | .04¼ |
| Black Silesias, soft | — | " | .03 |
| New Unbleached... | .06½ | " | .06¾ |
| Washable Prints.. | .02½ | " | .03 |
| Washable No. 1.. | — | " | .01½ |
| Blue Overall..... | .04 | " | .04½ |
| Cottons—According to grades— | | | |
| Washable shredding | — | " | .01½ |
| Fancy Percales.... | .03 | " | .03¼ |
| New Black Soft... | .02½ | " | .02¾ |
| New Light Seconds | — | " | .04 |
| New Dark Seconds | — | " | 1.50 |
| Khaki Cuttings— | | | |
| No. 1 O. D..... | .03 | " | .03¼ |
| No. 2 Mixed..... | .02 | " | .02¼ |
| Corduroy ..... | .01¼ | " | .01½ |
| New Canvas..... | .04½ | " | .05 |
| New Black Mixed. | — | " | .02¾ |

### Domestic Rags (Old)

| | | | |
|---|---|---|---|
| White No. 1— | | | |
| Repacked ..... | 3.00 | @ | 3.50 |
| Miscellaneous .... | 2.75 | " | 3.00 |
| Thirds and Blues— | | | |
| Miscellaneous .... | 1.35 | " | 1.50 |
| Repacked ..... | 1.55 | " | 1.65 |
| Black Stockings (Export) ..... | Nominal | | |
| Roofing Stock— | | | |
| Foreign No. 1.... | Nominal | | |
| Domestic No. 1.... | 1.35 | " | 1.40 |
| Domestic No. 2... | 1.15 | " | 1.20 |
| Roofing Bagging.. | 1.05 | " | 1.10 |

### Bagging

(F. o. b. Phila.)

| | | | |
|---|---|---|---|
| Gunny, No. 1— | | | |
| Foreign ..... | 3.25 | @ | 3.75 |
| Domestic ..... | 3.50 | " | 3.75 |
| Manila Rope..... | — | " | 5.50 |
| Sisal Rope..... | 3.50 | " | — |
| Mixed Rope..... | .75 | " | 1.00 |
| Scrap— | | | |
| No. 1..... | 3.25 | " | 3.50 |
| No. 2..... | — | " | 1.50 |
| Wool Tares, heavy... | 4.00 | " | 4.25 |
| No. 1 New Light Burlap ..... | 3.00 | " | 4.00 |
| New Burlap Cuttings | 3.25 | " | 3.50 |

### Old Papers

(F. o. b. Phila.)

| | | | |
|---|---|---|---|
| Shavings— | | | |
| Hard White Special | 3.15 | @ | 3.20 |
| Hard White..... | 2.90 | " | 3.00 |
| No. 1 Soft White.. | 2.40 | " | 2.45 |
| No. 2 White..... | 1.85 | " | 1.90 |
| No. 1 Mixed..... | 1.20 | " | 1.25 |
| Solid Ledger Stock.. | 2.00 | " | 2.10 |
| Ledger Stock, white. | 1.80 | " | 1.90 |
| Ledger Stock, colored | 1.70 | " | 1.75 |
| No. 1 Books, heavy.. | 1.25 | " | 1.30 |
| Manila Cuttings..... | 2.25 | " | 2.30 |
| Print Manila ..... | .75 | " | .80 |
| Container Manila.... | .65 | " | .70 |
| Kraft Paper..... | 1.75 | " | 1.80 |
| No. 1 Mixed Paper.. | .57½ | " | — |
| Straw Board Chip... | .50 | " | — |
| Binders Board Chip.. | .50 | " | — |
| Corrugated Board.... | .80 | " | — |
| Overissue News..... | .85 | " | .90 |
| Old Newspapers..... | .65 | " | — |

## BOSTON

### Old Papers

(F. o. b. Boston)

| | | | |
|---|---|---|---|
| Shavings— | | | |
| No. 1 Hard White. | 3.75 | @ | 4.00 |
| No. 1 Soft White. | 2.75 | " | 3.00 |
| No. 2 Mixed..... | .90 | " | 1.00 |
| Solid Ledger Books. | 2.25 | " | 2.50 |
| Overissue Ledger Stock ..... | 1.75 | " | 2.00 |
| White Ledger Stocks | 1.50 | " | 1.65 |
| Mixed Ledgers ..... | 1.25 | " | — |
| No. 1 Heavy Books.. | 1.20 | " | 1.30 |
| No. 1 Books, Light.. | .75 | " | .85 |
| Crumpled Stitchless Book Stock ..... | 1.25 | " | 1.35 |
| Manila Env. Cuttings | 3.00 | " | 3.25 |
| Manila Envelope Cuttings, extra quality | 3.00 | " | 3.25 |
| White Blank News.. | 1.70 | " | 1.80 |
| No. 1 Kraft..... | 1.90 | " | 2.00 |
| Extra No. 1 Kraft.. | 2.15 | " | 2.25 |
| Mixed Papers..... | .57½ | " | — |
| Print Manila..... | .70 | " | — |
| Container Manila.... | .65 | " | .75 |
| Old Newspapers..... | .65 | " | — |
| Paper Wool Strings. | 1.30 | " | 1.35 |
| Overissue News..... | .65 | " | .70 |
| Box Board Chips.... | .35 | " | — |
| Corrugated boxes.... | .80 | " | .90 |
| Kraft corrugated boxes | 1.60 | " | 1.75 |
| New Kraft Corrugated Cuttings.... | 2.00 | " | 2.25 |
| Screening Wrappers. | .85 | " | .90 |

### Bagging

(F. o. b. Boston)

| | | | |
|---|---|---|---|
| Gunny Bagging— | | | |
| Foreign ..... | (nominal) | | |
| Domestic ..... | 4.50 | @ | 4.60 |
| Sisal Rope ..... | 3.50 | " | — |
| Mixed Rope..... | 1.00 | " | 1.25 |
| Transmission Rope— | | | |
| Foreign ..... | (nominal) | | |
| Domestic ..... | 2.75 | " | 3.00 |
| Soft Jute Rope..... | 4.75 | " | 5.00 |
| Manila Rope— | | | |
| Foreign .....(nominal) | | | |
| Domestic ..... | 6.00 | " | 6.25 |
| Jute Carpet Threads. | 3.00 | " | 3.25 |
| Bleachery Burlap.... | 7.50 | " | 8.00 |
| Scrap Burlap— | | | |
| Foreign ..... | (nominal) | | |
| Domestic ..... | 4.25 | " | — |
| Scrap Sisal..... | 3.25 | " | 3.50 |
| Scrap Sisal for Shredding ..... | 3.25 | " | 3.50 |
| Wool Tares— | | | |
| Foreign ..... | (nominal) | | |
| Domestic ..... | 4.00 | " | 4.25 |
| Aust. Wool Pouches. | 4.75 | " | 5.00 |
| New Burlap Cuttings | 5.50 | " | 5.75 |
| Heavy baling bagging | 4.25 | " | 4.50 |
| Paper Mill Bagging.. | 3.50 | " | 3.75 |
| No. 2 Bagging..... | .50 | " | .60 |

### Domestic Rags (New)

(F. o. b. Boston)

| | | | |
|---|---|---|---|
| Shirt Cuttings— | | | |
| New Light Prints. | — | @ | .03 |
| Fancy Percales.... | .03¾ | " | .04 |
| New White No. 1. | .07¼ | " | .07¾ |
| New Light Flannelettes ..... | .05¼ | " | .05¾ |
| Canton Flannel, Bleached ..... | .07¼ | " | .07½ |
| Underwear Cutters, Bleached ..... | .07 | " | .07¾ |
| Silesias No. 1..... | .04¼ | " | .04½ |
| New Black Silesias.. | .04½ | " | .04½ |
| Red Cotton Cuttings | .03½ | " | .04 |
| Soft Unbleached..... | .07 | " | .07¼ |
| Blue Cheviots..... | .04½ | " | .04¾ |
| Fancy ..... | .01¾ | " | .02 |
| Washable ..... | .01¾ | " | — |
| Cottons—According to Grades— | | | |
| Blue Overalls..... | .04¾ | " | .04½ |
| New Black, Soft.. | .03 | " | .03¼ |
| Khaki Cuttings..... | .02¼ | " | .02½ |
| O. D. Khaki..... | .02½ | " | .03¼ |
| Corduroy ..... | .02 | " | .02¼ |
| New Canvas..... | .05½ | " | — |
| B. V. D. Cuttings... | .06¼ | " | .07 |

### Domestic Rags (Old)

(F. o. b. Boston)

| | | | |
|---|---|---|---|
| White No. 1— | | | |
| Repacked ..... | 2.75 | @ | 3.00 |
| Miscellaneous .... | 2.00 | " | 2.25 |
| White No. 2— | | | |
| Repacked ..... | 1.90 | " | 2.00 |
| Miscellaneous .... | 2.00 | " | 2.25 |
| Twos and Blues..... | 1.75 | " | 2.00 |
| Old Blue Overalls... | 1.60 | " | 2.00 |
| Thirds and Blues.... | 1.50 | " | — |
| Miscellaneous ..... | 1.25 | " | 1.35 |
| Black Stockings..... | 3.50 | " | 4.00 |
| Roofing Stock— | | | |
| No. 1..... | 1.20 | " | 1.25 |
| No. 2..... | .95 | " | 1.00 |
| No. 3..... | .85 | " | .95 |

### Foreign Rags

(F. o. b. Boston)

| | |
|---|---|
| Canvas .....(nominal) | |
| Dark Cottons.....(nominal) | |
| Dutch Blues.....(nominal) | |
| New Checks and Blues(nominal) | |
| Old Fustians.....(nominal) | |
| Old Linsey Garments.(nominal) | |
| New Silesias.....(nominal) | |

## WASTE PAPER SITUATION CLARIFIED

*(Continued from page 17)*

Company, Downingtown, Pa.; Downingtown Paper Company, Downingtown, Pa.; The Ruberoid Company, New York; Robert Gair Company, New York; National Folding Box Company, New Haven, Conn.; Schmidt & Ault Paper Company, York, Pa.; Johns-Manville Co., New York; Flintkote Co., New York; Atlas Publishing Company, New York; Reilly & Co., Easton, Pa.; Kieckhefer Co., New York; Federal Paper Board Company, Bogota, N. J.; International Paper Company, New York; Clifton Paperboard Company, Clifton, N. J.; Celotex Corp., Chicago; Certain-Teed Products Corporation, New York; Barrett Co., New York; Continental Paper Company, Ridgefield Park, N. J.; McEwan Bros., Inc., Whippany, N. J., and The Hemingway Company, Philadelphia.

Mr. Henderson pointed out that almost unanimous adherence to similar agreements has been obtained by OPACS from wastepaper dealers and consumers in the Middle West, with result that no mill in that area has been compelled to shut down because of shortage in supplies of wastepaper.

## To Handle Industrial Advertising

William F. Mohan, first vice president of Scott Paper Company, Chester, Pa., announces the appointment of G. A. Duff to handle the advertising for the company's industrial sales division as assistant to Harry Pardee, general advertising manager.

Duff has been with the company since 1927. He gained sales experience in Rochester, Boston, Pittsburgh and Chicago before becoming divisional sales manager at St. Louis. Since January 1, 1941, he has been Chief Sales Correspondent at Scott.

"Industrial division sales for the first seven months of this year were 35% ahead of the same period last year," said Mr. Mohan. "This phase of our operations is expanding so rapidly that it will be necessary to have Mr. Duff devote his efforts to coordinating our industrial advertising."